Invention Patent Specification

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An invention name: (Chinese / English)

Forward Link Rate Scheduling Method and Device / METHOD AND APPARATUS FOR FORWARD LINK RATE SCHEDULING

Second, the applicant: A total of people

Designated For the person to be served should be

Third, the inventor:

◎ Patent Agent:

4, the statement items

□Advocates of the Patent Law 27th the first international priority:

□Advocates of the Patent Law 29th the first domestic priority:

□ advocates Patent Law 26th of micro-organisms:

□ familiarize themselves with the technology to easily access, do not have storage

5, the Chinese invented Abstract:

With a change in the rate of transmission of CDMA systems, high-speed data transmission scheduling can improve the application prior to the reduction of data communication links in the transmission delay. Honeycomb-like cell communication with the new moon, the distance units for each designated a primary coding channels. For high-speed services under the hearing of the scheduling data transmission from one channel to specify a different type of scheduler and transmission capacity, the Deputy coding channel. Based on a set of system objectives, the parameter tables and the status of communications networks to collect information on the designated Vice-coded channels. Vice-coded set of synthesis of different sub-channel coding channel red. Split the data in the data box, and in the schedule has been designated to the

user's main channel and sub-coding channels encoded transmission of the data.

6, English inventor Abstract:

In a communication system capable of variable rate transmission, scheduling of high speed data transmission improves utilization of the forward link and decreases the transmission delay in data communication. Each remote station is assigned one primary code channel for the duration of the communication with a cell. Secondary code channels of various types and transmission capabilities can be assigned by a channel scheduler for scheduled transmission of data traffic at high rates. Secondary code channels are assigned in accordance with a set of system goals, a list of parameters, and collected information on the status of the communication network. Secondary code channels can be grouped into sets of secondary code channels. Data is partitioned in data frames and transmitted over the primary and secondary code channels which have been assigned to the scheduled user.

7, designated representative diagram:

(A) The designated representative case photo:

(B) to represent the symbols representative of a simple diagram of the device description:

8, the case if chemical formula, please reveal the best features of the invention can show the chemical formula:

9, inventions Description:

[Invention Content]

Invention Background

I. invented the field of

The invention of this invention on the field of data communication system. In particular, changes of this invention and has a data transfer rate of the communication system to link high-speed data transfer rate schedule before

the new and improved methods and devices related.
II. Related technical notes
Need a modern communications system to support a variety of different applications. One communication system for code division multiple Proximity (CDMA) system, this system meets the "dual-mode spread-spectrum frequency was honeycomb-like cell system TIA/EIA/IS-95A Mobile Station - Base Station Compatibility Standard", hereinafter referred to as for the IS-95A standard. CDMA systems allow users to link to on the ground between the voice and data communications. In the multi-access communication system in the past the use of CDMA technology can be found in U.S. patent application in case No. 4,901,307, entitled "Using the satellite or terrestrial repeaters spread-spectrum multi-proximity communication system, and the United States patent application No. 5,103,495 cases , entitled "In the CDMA cellular telephone system-like cells used to generate waveforms in the system and method", the article on this as a reference document of this paper.
IS-95A standard specified for optimum voice communications, and select a number of important system design parameters to achieve that goal. For example, because the time between the definition of the speaker can not tolerate, so try to make processing delays to a minimum. The user can be assigned a call during the hearing to send voice and data service channel. When the end of the call, another user may use the hearing service channel.
Based on IS-95A standard, designated to support 19.2Ksps News Service channel symbol rate. Use 1 / 2 rate encoder superimposition, each hearing the definition of data transmission service channel close to 9.6Kbps. While the IS-95A standard is not specified, but may use other coding rate to support higher data transfer rates. For example, by using 1 / 2 rate encoder and the superimposition 8 symbols in each cycle, two symbols to achieve 14.4Kbps data rate, while the penetration rate to be 3 / 4 stacked moraine encoder.
CDMA system must be in the honeycomb-like cells within the pre-existing frequency bands allocated to work. By

design, a line with IS-95A standard CDMA system can allocate bandwidth to fully use the 1.2288MHz honeycomb-like cell band. Prior to the link referred to as the distance from the honeycomb unit to the transfer station. The forward links, 1.2288MHz bandwidth synthesis of 64 coded channels, each channel has a 19.2Ksps coding channel coding. Most of the codes defined channel for the hearing service channel, if necessary, these channels can be allocated to voice communication users. Some coded channels defined for use in honeycomb-shaped units and distance units of the calls and messages sent between the call channel. Such as orientation and synchronization channels, channels for managing multiple coding systems be retained.

In the CDMA system, users communicate with each other through the distance units, rehabilitation through one or more base stations which communicate with each other. In this specification, the base station as far away as Taiwan and communication hardware. Projects will be based on the use of honeycomb-shaped cells known as the hardware or the geographic coverage area.

In the CDMA system, because one or more of the services by the base station makes the honeycomb-shaped cells which communicate between users. In a first stage, the user base and the second stage distant second user communication, or through the honeycomb-shaped cells with a reverse link transmission of voice data with a standard telephone communication. Honeycomb unit to receive voice data, and assign the data to another honeycomb unit or a public switch telephone network (PSTN). If the second user station at a distance in the same honeycomb unit or second honeycomb unit will be the first to link Taiwan to send data to the second distance. Otherwise, the data through the PSTN phone system assigned to the standard second user. In the IS-95A system, the previous link and reverse link assigned to different frequencies, and not related to each other.

In communication during the distant station with at least one honeycomb cell-phase communication. CDMA distance Taiwan with more than a free hand in the soft honeycomb-

like cells (soft handoff) during the same time communication. Soft hands-off for the break with the previous one before the honeycomb unit links with the establishment of a new honeycomb unit link procedures. Soft hands-off makes the probability of interruption of honeycomb-like cells to a minimum. Provided during the free hand in dealing with the soft by more than one of the honeycomb-shaped cells with distant station communication methods and systems can be found in the case of U.S. patent application No. 5,267,261 entitled "In the CDMA cellular telephone system in the cell-like action-aided soft-hands-off" designated to the assignee of the present invention, and the article on this as a reference document of this paper. Soft hands-off with a wide range of CDMA system design an impact on the Department because of the need to consider when allocating new resources contained in a free hand in the soft honeycomb-like multiple honeycomb units with each unit status and capacity.

CDMA system is a spread-spectrum communication systems, the advantages of this system is well-known to those familiar with this technology, see above reference documents. In the CDMA system, each code channel transmission rate can be up to the 19.2Ksps. Then the whole system bandwidth on a 1.2288MHz Show 19.2Ksps. Fewer bits transmitted by the IS-95ACDMA increase system capacity, so when the user does not talk, use less power. Because in the honeycomb unit and the distance between China and Taiwan prior to the link capacity by the honeycomb-shaped unit can be used maximum transmission power limit, and therefore idle to reduce transmission power will increase during the period prior to the link capacity.

Distance table in each user based on user-conversation-bit quasi-speech movement and the different levels of bit transfer rate of transmission of the data. A change in rate voice codec when a user chat cheating, and stopped in a quiet, such as low rates provide a full-rate voice chat. Change rate vocoder can be found in the case of U.S. patent application No. 5,414,796, entitled "Change-rate audio coding device" and appointed to the assignee of the present invention, and the article on this as

a reference document of this paper.
By the CDMA system supports multiple users of measurement used for honeycomb-like modules and a distant voice communication between China and Taiwan prior to the link capacity can be by far the user's bit rate-determining stage. This was because the link may decide prior to the capacity of the other parameters by the system design of a fixed or given. For example, by FCC rules and the adjacent honeycomb unit interval acceptable bit quasi limit the honeycomb-shaped unit can be used in transmission power, channel group. A given symbol rate required transmission power depending on the needs of distance units per million rate of the energy of the noise (Eb / No), the path depletion (ie, honeycomb-shaped unit in the distant location of stations), and noise-bit quasi-decision they were unable to be controlled. The need to maintain the performance required of the prospective position of the Eb / No and treat decay channel state involved. Finally, through the design need to select 1.2288MHz Di CDMA system.
The forward link transmission power required also associated orthogonal code channels. Walsh codes Spread used to achieve the pre-coded to link to the channel orthogonality. Orthogonality makes the interval between channel coding to a minimum. In the multi-path environment, and do not keep this orthogonality, the results of the prospective increase in interval spaces. Then add the required transmission power to maintain the same operating Eb / No.
At a given moment of the speech as non-decisive action. Also, basically the user moves bits between the quasi-independent voice. Therefore, honeycomb-like cells from a honeycomb-shaped cells to all the user's security transmission power change over time, and can be approximate as Gaussian distribution. When the voice in the quasi-action bit high and needs to send power over honeycomb unit can be used during the period of maximum transmission power, the application is less than optimal power transfer both voice data. Because depletion of a fixed path, so Eb / No drop. Low Eb / No increase to the user when receiving the voice data frame

error-prone. This condition is called reduced.
Proximity communication system may be the number of users is limited, making booking can be maintained when the frame error rate (FER). Restrictions on forward link capacity in order to maintain a predetermined FER, can be an average of less than full capacity, forced honeycomb unit transfer operations. In the poor example, in order to maintain the table header on to the 3dB space, may be a waste of half of the forward link capacity. In the honeycomb-shaped unit can be used maximum transmission power, and the honeycomb-shaped cells, the average transmission power, the difference between the head of the table space. This table header space is only used in the user's voice moves the high periods.
As compared with voice communications in the CDMA data communication within the system have different characteristics. Then, data communications are basically characterized by a long period of non-action or low action, high-data-hearing by the hearing of the change in the affairs of Cong. Data transmission needs of a mission-critical systems that need to send hearing bundle of data transfer delay. Transmission delay for the impact of data communications and audio communications are different, but the data communications for measurement were familiar with the quality of this technology is an important measurement values.
In the fixed-size box of code channels to transmit data when the hearing of a service method (which data sources provide the data transfer rate of change), can be found in the case of U.S. patent application No. 5,504,773, entitled "For the transmission of formatted data method and device ", this specifies to the assignee of this invention, and the article on this as a reference document of this paper. Data is divided into data frames and each data frame can be further divided into the data area. And encoded data encoding part of a wide channel is 20msec frame. In 19.2Ksps symbol rate, each code channel frame contains 384 symbols, when inserted (puncture) 1 / 2 speed to get the 3 / 4 rate, the use of superimposition based applications, the encoder needs to

encode the data. Use 1 / 2 rate encoder, information rate approximately equal to 9.6Kbps. In 9.6Kbps data rate, each code channel is shared box, 172 data-bit, 12-bit and 8 cyclic redundancy coding end of the bit.
Can be encoded in multiple channels to transmit data at the same time hearing before the link works to achieve high-speed data transfer. For data transfer using multiple channels of encoding methods can be found in the case of U.S. Patent No. 08/656, requested the case, 649, entitled "In a spread spectrum communications systems to provide data rate scheduling method and device", the date of application for the 1996 5 31, this article specifies the assignee to the present invention, the article on this as a reference document of this paper.
Prior to the connectivity requirements change over time to maintain, a part of the system because the sound changes in quasi-action bit with the rules. Action cycle in low voices through the transmission of data during the hearing before the link works to improve efficiency. In order to avoid reduced quality of voice communications, data transmission can be dynamically adjusted to meet the honeycomb-shaped cells can be used prior to the link capacity.
Data processing services in the hearing of the occasional large bundle hearing can be designed so that system capacity can be sent in high-speed data transfer, and can be based on the availability of resources prior to the allocation of resources to link with the requirements of users. In the CDMA system, the design must consider the other existing systems. First, because the voice communication can not tolerate too much delay, the priority necessary to give any data in the transmission of hearing the voices of service data transmission. And secondly, because at any time move the sound volume is not expected, so it should continue to monitor the forward link, and dynamically adjusting data transmission, makes no more than prior to the link capacity. Third, because the user can be in multi-cell honeycomb-like soft hands-off between the state, it should be let go based on soft state participation in the various honeycomb cell size

prior to the specified data transfer rate link. This invention addresses these and other considerations.

Invention Overview

The invention of the Department on the supply of new and improved high-speed data transfer method and device scheduling. Of the present invention to improve the use of forward link channel group and specify the data communication in the transmission delay, the Department of coding in the main channel and sub-code channels to transmit data to provide hearing services agencies reached the aforementioned improvements. With the honeycomb-like cell communication during the distant station for each channel designated a primary encoding. Honeycomb-like cells can be encoded using the primary channel for delivering small amounts of data and control messages, rather than be caused by the scheduling of other delays. The distance units can specify 0 or more coded channels deputy. Vice-coded channels can have many different types, and all have the same or a different type of transmission capacity as the primary coding channels. By the channel scheduler for high-rate data transmission scheduling hearing supplies and designate an alternate encoding channels. In each scheduling cycle, the scheduler from a channel coding channel designation, and in the scheduling cycle can be based on forward link capacity, the availability of re-designated. And Vice-coded channels can be divided into different sub-code channel group, of which Vice-coded by a single channel group definition of each group.

The purpose of the present invention performed in the CDMA system, the use of forward-link capacity. When the honeycomb-shaped cells with large amounts of data for transmission to the distant station, channel scheduler the amount of data collected will be sent, the network of honeycomb-like cells can be used prior to the link capacity and this will be illustrated below, the other parameters of the information. Collection of information and systems based on the target table, channel scheduler sets the distance from the allocation of resources and choice of sub-transmission rate

corresponding to the specified channel group scheduling, Vice encoding high-speed data transfer. The data is divided into data frames, and each data frame can be further divided into the data area. Coded all the data encoding parts and Spread into a channel when the box. The main channel in the specified encoding and sub-coding channels when the box to send coded channels. Distant station to receive the specified code channel coding channel is frame repeated assembly coding channel is part of the data frame. If the forward link transmission power for the increased demand, if necessary, can be one or more vice-coded channels stopped to meet other needs.

The purpose of the present invention allows another link to the data prior to the hearing service delivery delays to a minimum. By the channel scheduler based on the amount of data will be sent to specify the data transfer rate. In the main code channels at once to send a small amount of data. For the large amount of data, channel scheduler designate an alternate encoding channels. Vice-coded channels to increase prior to the link transfer rate, and thus reduce the need for large amounts of data transfer time.

The purpose of the present invention by sensing the other priority groups, through the allocation of resources available to the users, making the use of forward-link to Optimization. Based on priority groups, for the CDMA system, users specify the order of priority, these factors include the requirements for the performance of prospective users who place the needs of each element transmission energy, the amount of data will be sent and will send the data type, will be data services provided to the user's type, and amount of delay experienced by the user. Available resources allocated to the first user with the highest priority, and the final allocation has the lowest priority users.

Better implementation of the detailed description of cases

Now please refer to Figure 1, which states that contain multiple honeycomb units 2a-2's representation of honeycomb cell communication network. Each network by a corresponding base station 4 services. Although the present

invention can be applied to all radio communications format, but in the representation of the implementation of the case, the honeycomb-like cell network as a CDMA communication network. In the CDMA network, the distance around the distribution of the different units 6. The distance units 6 with one or more of the honeycomb-shaped cells communicate with each other, this depends on the distance a free hand in the soft state of Taiwan is determined. For example, the base station 6a and 6b and the base stations 4c communication is not connected to each other, distant Taiwan 6d and 6e with 4d communications base stations, and not connected to each other pass, but over the past honeycomb-shaped cells at distant station 6C in the soft hands-off state, and at the same time with the base stations 4c and 4d communications. In the CDMA system using soft-hands-off can be found in the case of U.S. patent 5,267,261 description.

Figure 2 shows the CDMA network of the present invention a typical block diagram of the basic structure. CDMA base station controller 10 and the encapsulation efficiency of the network network interface (PNI) 22, PSTN30 and all of the base station 4-phase-mediated access (For simplicity, Figure 2 shows only the base station 4). Base station controller 10 decides to CDMA network in the distance units 6 and other encapsulation PSTN30 network interface 22 and connect users to connect communications. PSTN30 via a standard telephone network (not shown in Figure 2) and referred the user access.

, The data source 20 may apply to the distant station 6 includes a large number of information transmitted. Data source 20 provides data to the encapsulation network interface 22. Encapsulation network interface 22 receives data and provides data to the selector element 14. Base station controller 10 contains many selector elements, although in Figure 2 for simplicity, is not displayed. Specify a selector element 14 to control one or more of the base station and the distance of communication between units 6. Does not yet specify the selector element 14 to the distant station 6, indicating the distance units 6 has not yet been designated a

primary code channel, then the encapsulation 22 informed the call control network interface processor 16 need to call the distance units 6. Then the call control processor 16 indicative base station 14 calls a distance Taiwan 6, and directed a primary encoding channels to distance Taiwan 6. In the distance units 6 has been designated as a primary code channel and the selector element 14 has been allocated, the envelope 20 from the data network interface 22 to transmit data to the selector element 14. Selector element 14 to maintain a line-up, this line-up includes six units that will have to distance decoding.

Channel scheduler 12 to connect the base station controller 10 as all the selector element 14. Channel scheduler 12 schedules high-speed data transfer and prior to the link designated for the 4-bit coding on the channel. Provide the specified transfer rate schedule to the selector element 14, through the base station 4 and the way forward for the allocation of six sent to the distant station.

When the selector box element, selector element 14 transmit data to base station 4. In this specification, refers to a data frame from the base station 4 to 1:00 time frame within the distant station 6 the amount of data. If one occurred in a number of coded channel data transmission, data is further divided into the data part of the frame, while the data frame in all the main channels and sub-code code channel transmission. So that the data area for data frame or all of the data box, and a part of, this depending on the required number of channels may be encoded. Coding parts of the data, and cheating codes generated by encoding the data channel is called when the frame.

From the selector element 14 transmit data to the selector box element 40a and 40b. Selector element 40a and 40b allows data frame format, insert the group generated CRC bits and a set of coded bits not yet reached, the application superimposition encoded data, and based on the above-mentioned U.S. patent 5,504,773 the case of interlaced encoded data. Then apply a long virtual noise (PN) code, Walsh code and short PN_I And PN_Q Code will be interleaved

spread spectrum data. From the transmitter (TMTR) 42 up-, filtering and amplification spread-spectrum data to obtain RF signals. 50 on the forward link antenna 44 via RF signals transmitted through the air.
Taiwan, 6 in the distance from the antenna 60 to receive RF signals, and routing to the receiver (RCVR) 62. 62 receiver filtering, amplification, down-conversion, and quantify the RF signals, and provides the digital baseband signal to the demodulator (DEMOD) 64. By the solution of spread-spectrum demodulator 64 digital baseband signal. 66 implementation of the decoder in the base station 4, the inverse function of the implementation of signal processing, especially the de-interlacing stacked product decoding and CRC check functions. Decode the data provided to the data storage device 68. As demolition above, the hardware support in the CDMA network data and voice communications.
Can also be configured by the other to complete the function. For example, channel scheduler 12 and selector components 14 can be included in the base station 4 within. Channel scheduler 12 and selector components 14, depending on the location of the need for a centralized or distributed scheduling processing. Therefore, the idea of the above-mentioned functions may be other configurations, and these configurations are in the viewpoint of the present invention within the allowed.
Forward link transmission can be divided into two categories. The first category includes not schedule work in a better implementation of the case, the solid for the additional processing delays can be tolerated. Does not work has not yet been scheduled. This category includes the voice communication and managing some systems (overhead), the executive can be driven, call information and inform the data on hearing services. The second category includes scheduled tasks, this work included scheduling of additional processing and queue delays. This category includes honeycomb units 6 units and the distance between the majority of data communication. This second category can be designated high-rate.

Shown in Figure 1, the distance units 6 can be distributed via the CDMA network, and at the same time with one or more of the honeycomb-like cell communication. Therefore, the channel scheduler scheduled throughout the CDMA network on the scheduling and delivery is not scheduled to work. In this invention, by the channel scheduler can be based on forward link capacity, honeycomb-shaped units and distance units 6 to the link between the pre-delivery work schedule in order to avoid scheduling and not scheduling the work of the transmission decline in quality. Channel scheduler 12 can be used for information that can be allocated to the CDMA network within the distant station 6 on the scheduling of users, making a set of objectives can be achieved Optimization. These objectives include (1) through the transmission system capacity may be permitted within the limits of schedule and is not scheduled to work as the use of forward link, (2) by the increase in transfer rate and allows data transfer delay to a minimum of the implementation of communication quality, and (3) Based on a set of priorities, and fair allocation of resources to all users of the schedule. To balance an external table, causing the target to achieve the optimal technology, this will be described below.
Figure 3 shows the invention of the channel scheduler 12 of the block diagram. Controller from the CDMA network to collect from all the relevant information honeycomb-like cell, and scheduling high-speed data transfer. In micro-controllers, microprocessors, digital signal processing (DSP) chips, or a program set up to implement the function of the text configuration controller 92 within the ASIC. Controller 92 prior to link to the collection and the demand for and the honeycomb-shaped cells can be capacity-related information. Collection of information stored in memory device 94, and if necessary re-taken by the controller 92. Can use the storage components or any number of distant Taiwan memory devices in a device configuration memory device 94, the memory devices, such as RAM memory devices, latches, in learning to know any type of technology known as memory devices . Controller 92 also connected to 96-hours

component. Clock component 96 can be configured to one driven by the system clock counter, and a locking plate internal signals in an oscillator, or used from an external source, a receiving system components, storage components. Clock component 96 provides the controller 92, this controller clock signal necessary for the implementation of forward link rate scheduling. Clock signal also allows the controller at the appropriate intervals to send the specified data transfer rate of 92 scheduled to selector element 14.

1. Prior to the link rate scheduling

Figure 5 shows the rate of the present invention prior to the link flow scheduling method. Schedule treatment in the first step (step W200), include the collection of all the scheduling for the users of the optimal allocation of resources so necessary to the relevant information. Information may include the honeycomb-shaped unit can be used maximum transmission power, the number of scheduling and not in the scheduling cycle for each distant station 6 is not scheduled to work the transmission power, for the previous scheduling cycle, scheduling the work of each element to send energy and will schedule and the amount of data transmitted to the user, listing of distance communication station 6 of the honeycomb-shaped cells distant sets of six components of the action group, and the honeycomb-like unit of the transmission channel encoding used. This will be described below, these parameters. The honeycomb-like cells from the collection of information, channel scheduler 12 based on the collected information and the above-mentioned step 202 in the target group scheduling the allocation of resources to the user. The allocation of resources can be allocated for a specified transmission power, transmission rate or pattern. Then, based on scheduling needs of users while the energy per yuan will be allocated transmission power as the time to send rate subreport. Then specify the transfer rate on the schedule transmitted to the distant station 6, this distance units 6 has been specified in step 204, a transfer rate. Transfer data to selector element 14 and at the specified transfer rate, and the pre-determined number of time frames, the

transmission sub-station distance 6. Then in step 206, the next scheduled time and then start scheduling cycles ago, the channel scheduler to wait for the next action.

As mentioned above, can be implemented for at least two patients completed the allocation of resources. In the first implementation of the case, the channel scheduler 12 specifies the data transfer rate to each scheduled user and the implementation in the second case, the channel scheduler allocate transmission power to each row of way users.

In the first implementation of the case, the flow chart in Figure 5 in step 202, from Figure 6 further shows the flow chart of the user scheduling the allocation of resources. Already collected for the optimal scheduling user specified data transfer rate required when the relevant information, channel scheduler 12 into the Figure 6 flowchart. 210 in the state began to channel scheduler 12. In the first step, channel scheduler 12 calculation steps in the CDMA network 212 of the honeycomb-like cells using the total residual power. The honeycomb-like units of the transmission schedule by using the total residual power is calculated as follows:

$$P_j = P_{max,j} - P_{backoff,j} - \hat{P}_{unscheduled,j} \quad (1)$$

In this P_jFor the honeycomb-like cell j can use the total residual power, $P_{max,j}$Honeycomb-like unit j for the maximum transmission power, $P_{backoff,j}$For the withdrawal of honeycomb-like cells (backoff) power, and$P_{unscheudled,j}$As for the honeycomb-like cell j are not in the work schedule required to predict transmission power. Exit power of a value, can be applied to scheduled time slots scheduling and not scheduling the work of the needs of changes in transmission power, honeycomb-like cells. Out of power can also be used in the work schedule prior to the link power control. This will be described below equation (1) of the power items and equation (1), the other derived items.

Then in step 214 generate all the scheduling priority of the users table. Priorities for the function of several factors. In accordance with relevant priority allocation scheduling users,

with the highest scheduling priority the user placed on top of the table, and with the lowest scheduling priority the user put the bottom in the table. Channel scheduler 12 then enters a loop, and the priority list based on the specified link that can be used prior to their capacity for scheduling the user. Transfer rate specified in the loop the first step, in step 216, the channel scheduler 12 with the highest priorities in order of priority order of the table is simple to schedule the user. Then C12 Identification support this scheduling the user's honeycomb-like cells. The user's actions in the scheduling component groups listed honeycomb-like cells. In the typical implementation of the case, on the actions of various cellular components of group-like unit and the primary coded collar Road in the distance units 6-phase communication. Deputy coding channel high-speed data transmission via action component in the group 1 or more of the honeycomb units to be completed. Channel scheduler 12 first choice movement component in the group honeycomb unit to support high-speed data transfer. For each simple honeycomb-like units, in step 218, the channel scheduler 12 for scheduling users to calculate the maximum transfer rate can be supported. Can be transmitted to the schedule when the user needs the energy for each element of the honeycomb-shaped cells among options that can be used while calculating the total residual power Xu support maximum transfer rate. In order to determine the various options available honeycomb-like units for allocation to scheduling the user's transmission power, in step 220 channel scheduler 12 from the maximum transfer rate supported by the minimum transfer rate options. Choose the definition of the minimum transfer rate for this scheduling the user's maximum transfer rate. C12 through the data and then lined up the length of the search, said schedule will be transmitted to the user's data. Since then lined up on the size of the channel in step 222, scheduler 12 suggested a better transfer rate. Better implementation of the cases of transmission rate scheduling interval, the minimum required to transmit data transfer rate.

In step 224, the channel scheduler 12 based on better data

transfer rate and the maximum transfer rate, for scheduling the user specifies a data transfer rate. The specified transfer rate for a better transfer rate and the maximum transfer rate in the lower once again maintain the option honeycomb-like cells, the total residual power of a compromise between. In the specified data transfer to schedule the user after the step 226, the C12 from the priority scheduling cycle, the table users. Then in step 228, the updating of the honeycomb-shaped cells can be used select the total residual power in order to reflect the user's power allocation scheduling priority in the table are from the period. Then in step channel scheduler 12 decides on the priority list for all users whether the schedule has been designated a transfer rate. If the priority table does not empty, channel scheduler 12 at step 216 back to the specified data transfer rate and the highest priority for the next scheduled user. In priority order table does not contain any user before the scheduled repeat of this guiding. If the order of priority set to open the table, then ends in step 232 will return the specified program.
Better implemented in the second case, the flow chart in Figure 2 in step 202, for scheduling the user of the resource allocation by the allocation of a transmission power to each row of way for users to reach. In this implementation example, the steps 210,212,214 and the first implementation of the cases of the same, only the allocation of transmission power by an alternative to a transfer rate of the specified loop circuit. The transmission power distribution circuit within the first step, channel scheduler 12 in the priority order of the table has the highest scheduling priority the user. Channel scheduler 12 then select the action component group honeycomb unit, this component group used to support high-speed data transmission scheduling users. For each choice of honeycomb-like cell, channel scheduler 12 for scheduling the user can be supported by calculating the maximum transmission power. To determine the schedule for this user's allocation of transmission power available by the choices provided by the honeycomb-like cell, channel scheduler 12 can be supported from the largest table to select the

transmission power, the minimum transmission power. Channel scheduler 12 then lined up based on the size recommended a better transmission power. The allocation of transmission power to a minimum transmission power, and better the lower transmission power. Then the allocation of transmission power transmitted to selector element 14, the selector element 14 sensing the distribution of power and transmission rate scheduling users in need of energy for each element is specified in a particular transfer rate.

In the allocation of a transmission power to schedule the user, the channel scheduler 12 removes from the priority list scheduling users. Then update the select honeycomb-like unit that can be used to reflect the allocation of the total excess power is moving from the table in order of priority scheduling cycle, the user of the power. Channel scheduler 12 then indicate whether the table in order of priority for all users of the schedule that has been assigned a transmission power. If the priorities sequence table does not vacant, then the channel scheduler 12 to allocate transmission power, with the highest scheduling priority the user. Repeat transmission power distribution circuit, until the priority table does not contain any user date scheduled. If the priority list of vacant, then the end of this allocation process.

In the second implementation example, the selector element specified schedule based on the needs of users in the Eb / No change it, and for scheduling time slots in the time-frame for each user-specified schedule the new data transfer rate. This allows Xuanyi device components 14 through the maintenance of the required Eb / No, to limit the honeycomb-shaped unit can be used within the maximum transmission power, required transmission power, while maintaining scheduling and not scheduling the communication quality of the work.

The choice honeycomb unit can be used in the total excess power, you can not use the distribution loop, while the allocation to scheduling the user. For example, the total transmit power can be distributed based on the weighting function. May be sensing the user's scheduling priority and /

or some other factors to decide weighting function.
Excellent decision to charge the order form to schedule a user's resources (such as transmit power) allocation. For the highest scheduling priority the user assigned a low priority item order scheduling the user more resources. Although the best schedule based on the user's priorities and the allocation of resources, although this is not a must need for restrictions. That can be used in any order based on the allocation of resources are available, this point of view of the present invention are those allowed.
The invention prior to the link rate scheduling sustainable, cyclical, or staggered manner. If continuous or periodic implementation of the scheduling operation, side-select schedule interval makes the honeycomb-like cell transmission power scheduling cycle in full use, but no more than the honeycomb-shaped maximum transmission power units. The following cases can be implemented to accomplish this purpose. The following implementation of the cases may be the idea of the rate of or in conjunction with the implementation of other cases of this were the views of the present invention within the scope permitted.
In the first implementation of the case, each time frame are performing scheduled operations (or resource allocation). The implementation of the cases to allow channel scheduler 12 dynamically allocated each time the box for the scheduled work required to fully use the network transmission power of each honeycomb unit can be used in the total residual power. Need more time to handle distribution of the cabinet resources. Moreover, the need for more executive will need to send the schedule information to the box office each time the user schedule.
In the second implementation example, each of K time-frame for the implementation of a scheduled operation, in which K is an integer greater than one. For each scheduling interval, channel scheduler 12 for scheduling work assignments of all the largest amount of resources. In the representation of the implementation of the case, from equation (2) to remove out of power $P_{backoff}$While calculating the maximum distribution

of information and / or use of the work schedule does not need to transmit power $P_{unscheduled, j}$,The next forecast calculated. In addition, you can use than equation (1) the actual $P_{max, j}$ Numerical bigger maximum allocation of resources. Each scheduling cycle, the transmission power to send the specified schedule. This will be described below, for a specific transfer rate at the transmission rate of the scheduled number of hours after the frame. In the scheduling cycle, from the distribution channel scheduler 12 schedule for about maximum allocation of resources. In the scheduling cycle, if the honeycomb-shaped unit can be used in the total remaining transmit power is not specified to support data transfer rates, then the channel scheduler 12 at a lower data transmission under the specified data transfer.

The second advantage of the implementation of cases scheduled for the user to transfer the specified transfer rate schedule less time managing messages only. In the first implementation of the case, in the box to send each time the specified transmission rate schedule to the scheduling of the user. Therefore can be used as part of the transmission power allocated to the executive. In the second implementation of the cases in each scheduling period, transfer the specified transfer rate schedule to the scheduling user. For example, if and scheduling interval is 10 frames, the second implementation of the cases needed to implement than the first cases of managing even a small 1 / 10, and still maintain the effective use of the forward link.

In addition, the implementation in the third case, the present invention may be staggered forward link rate scheduling. In this implementation example, can be triggered by certain events scheduled. For example, as long as high-speed data transmission to receive a request or the completion of off-shore platform scheduling of the six high-speed data transmission, channel scheduler 12 prior to link the rate of an executable schedule. Channel scheduler 12 knows the distance units 6 to the amount of data transmitted, and the specified transfer rate. Therefore, channel scheduler 12 may

determine the date of completion of high-speed data transfer. When the distance between the end of the 6-scheduling transmission, channel scheduler 12 schedules the executable, then the allocation of resources to other areas prior to the links in the distance units 6. Send the specified transfer rate I have specified transfer rate in the distance units 6.
Link to this invention prior to the scheduled rate of CDMA network by the honeycomb-like units for all channel scheduler 12 implementation. This configuration allows channel scheduler 12 for the effective free hand in the soft state and with a number of honeycomb-like cell communication in the distance units 6 high-speed data transmission scheduling. Since the honeycomb unit and the distance between the six different sets of interaction to make, so for the entire network schedule more complex. To simplify scheduling, scheduling of work can be divided into two categories, which let go the distance for use in soft-station 6, and do not use a free hand in the soft distant station 6 in the work schedule. With this configuration, is used with a single honeycomb cell communication in the distance units 6 rate schedule prior to the link in honeycomb-like cell in the implementation of expectant. And selection of honeycomb cell communication in the distance units for the 6 channel scheduler 12 schedule. This invention can be the first to link the rate schedule for all configurations, including centralized scheduling, distributed scheduling, and any combination. II redistribution of resources
The first implementation of the above-mentioned cases, each time-frame for the implementation of resource allocation, scheduling cycle in the allocation of resources can be scheduled to meet prior to the link transmission power needs. While each time-frame that the allocation of resources, scheduling delays could lead to sub-optimal allocation of resources. Delay in the scheduling period, the state-mei-varying systems. Moreover, the initial projections from time accurate, and may need to be modified.
In the second implementation of the case, a time-frame for the implementation of the K distribution of resources in the

scheduling cycle, during which the resources can be re-allocated. In the second implementation of the cases of the representation of configuration for the scheduling cycle, was shown under the transmission rate of data transmission, without the use of resources re-allocation procedures. This simplifies the scheduling order, but will lead to disable the transmission of power when you need more than honeycomb-shaped cells can use the maximum transmission power generated when this situation. In a better configuration, each time frame re-allocate resources to enable the output to a minimum.

In the scheduling cycle, if the total for the honeycomb-like cells in non-designated transfer excess power to support data transfer rates, then the channel scheduler high-speed data transmission can be carried out under a lower transmission rate of data transfer. For this honeycomb cell, the total residual power is insufficient to meet scheduling and not scheduling the demand for the work of those who, channel scheduler before the decision to link the increasing demand for capacity, you can use to link to the first resource; and specified for some or All links prior to the designation of the lower transmission rate, making the need for the honeycomb-shaped cells required transmission power does not exceed the honeycomb-shaped cells can use the maximum transmission power. In the representation of the implementation of the case, the low transfer rate only for a temporary transfer rate and only for a time frame. For the next scheduling cycle, the time frame, and then by channel scheduler 12 at the transfer rate is modified before the specified transmission power. In the typical implementation of the inverted, each time-frame for implementation of the re-allocation of resources to ensure that the honeycomb-shaped unit for scheduling and not scheduling the work required transmission power is less than the honeycomb-shaped unit can be used in maximum transmission power. Number of cases of full implementation by re-allocation of resources, this will be illustrated below, the implementation of the other two cases. Familiar with this technology can implement the concept of other cases of this

were within the view of this invention.
In the first implementation of the case, for the above re-allocation of resources to implement the first cases of complement by the transfer rate and then specify a re-allocation of resources. Figure 7 flow chart to illustrate the implementation of cases. In step 240 to start channel scheduler 12. In the first step, step 242, the channel scheduler 12 in the network, resulting honeycomb units, of which scheduling and not scheduling the work of the use of transmission power over honeycomb-like unit that can be used to send power. Then in step 244, the channel scheduler 12 using equation (1) in the calculation of honeycomb-like cell in the table of encoded channel frame can be used when the total residual power. Secondly, in step 246 the channel scheduler 12 to produce all scheduling priorities of users, of which the scheduling users and honeycomb-like cell in the table for at least one honeycomb cell communication, and has taken place on the schedule for the specified period a transfer rate. In the priorities scheduling order in the table the user is called a valid schedule user. Channel scheduler 12 then enters a loop, and the basis of priority tables and honeycomb-like cells form an effective re-designate some or all of the user's transfer rate schedule.
In step 248, the transmission power, and then specify the loop on the first step, channel scheduler 12 choices in order to be effective with the highest scheduling priority the user. Then channel scheduler 12 for high-speed data transmission, identification of users support effective scheduling honeycomb-like cells. The honeycomb-shaped cells known as the choice of honeycomb-like cells. Second, in step 250, the channel scheduler 12 For each option honeycomb cell to be effective scheduling users can be supported by calculating the maximum transfer rate. In order to ensure the user for this schedule may be required transmission power for each option provided by the honeycomb-shaped cells, in step 252 the channel scheduler 12 can support data transfer rate from the largest and designated transmission rate of the table, select the minimum transmission power. In step 254, define a

minimum transfer rate of Xuanyi temporary transfer rate. In a better implementation of the case, basically the time frame will enter, only to schedule the user specifies. In step 256, from the priority table and effective scheduling cycle, the user. Then in step 258 to update the various options honeycomb-like cells can be used in the total remaining power is allocated in order to reflect the priority list from the cycle to be effective in scheduling the user's power. Channel scheduler 12 then updates the table honeycomb-like cells, and in step 260, the removal of the remaining power of the total output of honeycomb-like cells. Second, in step 262, the channel scheduler 12 decides that the honeycomb unit easily have been vacated. If not, in step 264, the channel scheduler 12 decided to give priority order of the table easily have been left vacant. If the priority table does not vacant, and the channel scheduler 12 back to step 248, and then specify a data transfer rate with the next highest priority to the effective scheduling users. Sustained transfer rate and then specify the circuit to determine the honeycomb-shaped cells form honeycomb-like cell priority list until the vacancy. If the honeycomb units vacant table or tables in order of priority, then in step 266 the end of the transfer rate and then the specified procedure.

In the second implementation of the cases (the cases of the implementation of the re-allocation of resources for the above order of the second implementation of the additional cases, including the redistribution of power from the transmission to complete the redistribution of resources. In this implementation example, the steps 240,242 and 244 and The first implementation of the cases of the same, only the specified transfer rate of re-routing a transmission power back to replace the redistribution circuit. In the transmission power, the first step in the redistribution of loop, channel scheduler 12 in the network, resulting honeycomb cell honeycomb-like cell table, in which scheduling and not scheduling the work required to transmit power in excess of the honeycomb-shaped unit can be used in transmission power. the definition of a shortage of transmission power,

citing a honeycomb-shaped cells needed transmission power minus honeycomb unit can be used in transmission power . Second, the channel scheduler 12 to produce all scheduling priorities of users, of which the scheduling users and honeycomb-like cell in the table for at least one honeycomb cell communication, and scheduling cycles that occur have been allocated a transmission power . In order of priority scheduling table as an effective user scheduling the user. Lingdao scheduler 12 then enters a loop, and the basis of priority tables and honeycomb-shaped cells or all of the table would no longer be a valid schedule the use of persons.
In the transmission power, the first step in the redistribution of loop, channel scheduler 12 has the lowest priority choice of effective scheduling users. Then channel scheduler 12 for high-speed data transmission, identification of users support effective scheduling honeycomb-like cells, and the redistribution of transmission power in order to reduce the transmission of power shortage in the redistribution of power transmitted to selector element 14, the selector element sensing re - the allocation of transmission power, decided to temporarily transmission rate, and effective scheduling the user needs the energy for each element. Then used to form an effective scheduling cycle, the user, and updating of the choice of power shortage in honeycomb-shaped unit to reflect the re-made power. Secondly, the channel scheduler 12 updates honeycomb-like cell form, and there is no power to remove the shortage of honeycomb-like cells. If the honeycomb-like cell form and order of priority tables are vacant, then the redistribution of channel scheduler 12 with the lowest priority in order to be effective the next scheduled user's transmission power. Continuous redistribution of loop transmission power until the honeycomb-shaped cells form honeycomb-like cell priority list until the vacancy. If the honeycomb-like cell form or priority list of vacant, then the end of the loop transmission power redistribution.
In each scheduling cycle, when the box to perform the redistribution of resources to allow channel scheduler in each time prior to the link box dynamically allocated resources.

Others who need to send a temporary transfer rate of the scheduling, managing to reach the smallest, was due to the box at all when only a small sub-schedule and then specify the user's transmission rate. In fact, only enough users and then specify the schedule, making the Internet all the honeycomb-like cell transmission power is less than the minimum of the honeycomb-like cells that can be used to send power.

Number of cases completed by the implementation of the temporary transfer rates of data transmission and reception, this will be illustrated below, the implementation of the other three cases. Familiar with this technology can implement the concept in other cases, and this point of view both within the present invention. In these cases the representation of the implementation of the configuration occurs in a number of coded channels high-speed data transfer. This will be described below, the use of learning for high-speed data transmission channels with coding and coding Channel Group in the concept. Basically, for each distant station 6 from the channel scheduler 12 lash specified transfer rate of a group of coded channels subreport. Specify the encoding channel identification code transmitted to the distant station 6. In the scheduling cycle, the distance units 6 for each time frame to receive the specified code channel transmission of data. For the time being under the transmission rate of data transmission, using the specified encoding a subset of channels.

In the first implementation of the example code in the main channel to send a temporary transfer rate to the distant station 6 on the effective scheduling users. Meanwhile, at the same time box office in the temporary transfer to an effective transfer rate schedule user. Subset of the identification code transmitted to the box each time the distance units 6, which formed under the temporary transfer rate data transfer. Distance units 6 demodulation associated with the specified transfer rate of the main channel and sub-coding channel coding. And then maintained at a distant station 6 receives Vice-encoded channel data (from the Under-encoded channel

associated with the temporary transfer rate) and the removal of the remaining data.
In each scheduling cycle, when the box offices, scheduling the transmission rate of the specified users to receive data transfer. For each time frame, schedule, whether the user identification data transfer rate has re-appointed. If you schedule the user decides that the data transmission system on a temporary transfer rate occurs, then schedule the user remain at the temporary reception of the data transfer rate part of, and remove the rest of the data. In scheduling users can encode as they deal with the main channel decided to delay receiving data subset of what has worked before, to receive data need to be saved.
In the second implementation example, in the main transmission channel coding rate of a temporary transfer to the distant station 6 on the effective scheduling users. Another distant station 6 receives the temporary transfer rate and the configuration of hardware in order to receive the temporary transfer rate of data transmission after the 2:00 box after the temporary data transfer. The implementation of the cases of other processing delays, but it can make the buffer distance units 6 to achieve the minimum. However, this implementation of the cases the distance to save battery power on a platform 6, the Department because only the demodulation and decoding of high-speed data transmission channel coding. But because the scheduling delays of resources can not achieve the optimal dynamic allocation. Moreover, the scheduling delay may lead to type arising out of the higher power requirements.
In the third implementation of the case, the distance units 6 demodulation of all specified data transfer-related sub-coding channels, and execution of the takeover code channel frame on when the CRC check. Then the distance units 6 to maintain the time-frame encoded data on channel location, where the coding channel is box does not contain any time-frame errors, and removed when the box containing the coding channel, when frame errors.
III transmission power on the considerations

As noted above, no work schedule required transmission power, such as voice communications, may change over time, but when necessary, will be allocated to required distance units 6. In order to maintain signal quality at an acceptable bit-accurate, the honeycomb-shaped cells of total transmission power needs to be large honeycomb-like cells can be used below the maximum transmission power. Accordingly, the honeycomb-shaped cells require a total transmission power should meet the following statement holds:

$$P_{unscheduled,j} + \sum_{i=1}^{N_j} P_{ij} \le P_{max,j} \quad (2)$$

Where $P_{unscheduled,\ j}$= For the next scheduling cycle, the scheduling of work is not the first j-channel scheduler required transmission power.
N_j= J honeycomb cell in the schedule by scheduling the number of users, P_{ij}= J honeycomb cell in the first transmission power users need to schedule the transmission of power, as well as the $P_{max,\ j}$= J-honeycomb unit can use the maximum transmission power.
The honeycomb-shaped cells require a total transmission power should be maintained during the entire scheduling cycle, the honeycomb-shaped cells can be used below the maximum transmission power in order to avoid scheduling and not scheduling the work of the transmission is not generated the expected decline. The honeycomb-like units can use the maximum transmission power were different, although by the FCC and the adjacent honeycomb cell interference considerations, adjustment to the cap. Channel scheduler 12 The purpose of the work schedule delivery schedule, making the entire scheduling cycle transmission power close to the maximum transmission power, though no more than.
Break point in the IS-95A standard of CDMA systems, honeycomb-shaped cells, the average transmission power from the largest transmission power required under the reserve header space. This provides a margin to operate six

mobile units in the distance needed to link prior to the dynamic power control mechanism. For scheduling the work of the table is not the first space to adapt to changes in the transmission power required, such as the scheduling cycle, the amount of change during the motion generated by sound changes. Will withdraw from power be taken into account, the equation (2) becomes:

$$P_{unscheduled,j} + \sum_{i=1}^{M} P_{ij} \leq P_{max,j} - P_{backoff,j} \quad (3)$$

As noted above, does not need to exit the power to adapt to the dynamic changes in work schedule. Maximum transmission power from the average transmission power, the operation of the honeycomb-like cells under the need to provide scheduling and not scheduling the work of high-quality communications. Out of power ensure that the sound moves, such as high during the time of high demand can be used to send power. Exit Power has indicated that most of the time (such as normal or low voice during the action) can use the forward link. Via dynamic change for the scheduling of work and effective use of transmission power, forward link, to complement the needs of work is not scheduled to send power to increase or schedule.

In order to satisfy the equation (3) restrictions, channel scheduler 12 needs for the next scheduling cycle, the honeycomb-shaped cells did not schedule the work of the various decisions required transmission power. Scheduled to work who do not need to transmit power mainly by the sound volume and channel state action decisions. Therefore, the required transmission power can not be accurately decided that the Department because the voice and channel characteristics of the state's unpredictable. For the design concept of the need to transmit power may be through the right Qianyi Pai Cheng-cycle schedule of work is not the average actual transmission power and be predicted. For the forecast is not scheduled to work with transmission power $P_{unschedulad,\ j}$,Said, and then use the power in the next calculation.

For scheduling the work required transmission power P_{ij}6 For the distant station via the user determine the performance of various scheduling and transmission bit rate requirements for quasi-every element of the required transport energy. The distance units 6 units 6 based on the location of distant ask you to transport energy to a different element. For example, almost honeycomb-like cell location (such as the recent service honeycomb cell base station 4C) in the distance units 6a (see Figure 1) After the path less wear and tear, and therefore the performance spaces that require accurate, requires less every Yuan transfer of energy. On the contrary, almost honeycomb-like cell edge of the distant station 6c performance spaces for the same quasi-need more transmission power per element. For each row of way users, in the last base station controller 10, selector element 14 in the understanding of the previous transmission power$\underline{P}_{ij}$And the former a transmission power$\underline{R}_{ij}$. These two measured values for the basis of subreport $g_{ij}=\underline{P}_{ij}/\underline{R}_{ij}$The previous calculation the energy for each element. Then the average energy of each element of g_{ij}From / g_{ij}Decided that the statistical average. For example, define the average, each element of the energyg_{ij}The average of the last four inserted values. Previously known to transmit the energy of the average, each element, channel scheduler 12 for scheduling cycle is about to enter the schedule of work required is forecast transmission power $P_{ij}= g_{ij}\cdot R_{ij}$In this R_{ij}To specify the transfer rate for the Q's. Therefore, when the allocation of resources changes, the channel scheduler 12 will meet the subreport as follows:

$$\hat{P}_{unscheduled,j}+\sum_{i=1}^{N} g_{i,j}\cdot R_{i,j}\le P_{max,j}-P_{backoff} \qquad (4)$$

Adjusted to the distant station 6 prior to the transmission rate of link transmission power in order to maintain the performance required for quasi-bits. Can be configured in one of several methods prior to the link power control mechanism. For example, the forward link voice

communications, distance Taiwan decided to encode six channels when the box is receiving the error. If an error occurs when the frame, then the distance units 6 to send an error indication bit (EIB) message back to the honeycomb-shaped unit, request for additional transmission power. Then the honeycomb unit to increase transmission power, until the time frame to receive stopped. In addition, the honeycomb-shaped frame error rate when an executable unit distance units (FER) of the statistical average operation, to change the transmission power based on FER. Both of these methods can be transmitted prior to the link power control. In the third method, in the distance units 6, demodulator 64 based on measurements of the received signal noise ratio calculation of the signal. Then the distance units 6 to send a message to the honeycomb-shaped cells, require the calculation based on the signal to noise ratio to increase or decrease transmission power. Point of view of this invention can be used to determine the equivalent data transfer applications in each element of the energy needs of all the methods.
The configuration and use of EIB transmission can be found in the case of U.S. patent application No. 5,568,483, entitled "METHOD AND APPARATUS FOR CONTROLLING POWER IN A VARIABLE RATE COMMUNICATION", date for application is July 29, 1994; U.S. patent application for case No. 08 / 414,633, entitled "METHOD AND APPARATUS FOR PERFORMING FAST FORWARD POWER CONTROL IN MOBILE COMMUNICATION SYSTEM", date for application is March 31, 1995; U.S. patent application case No. 08/559, 386, entitled "METHOD AND APPARATUS FOR PERFORMING FAST FORWARD POWER CONTROL IN A MOBILE COMMUNICATION SYSTEM ", date for application is November 15, 1995; U.S. patent application case No. 08/722, 763, entitled" METHOD AND APPARATUS FOR MEASURING LINK QUALITY IN A SPREAD SPECTRUM COMMUNICATION SYSTEM " the application date is September 27, 1996; U.S. patent application case No. 08/710, 335, entitled "METHOD AND

APPARATUS FOR PERFORMING DISTRIBUTED FORWARD POWER CONTROL", date for application is September 16, 1996, the article specified to the assignee of this invention, tied for the article of the reference documents. Channel scheduler 12 prior to link the allocation of resources to the honeycomb-like cell scheduling users, making equation (4) to satisfy all of the honeycomb-like network unit. In the coming scheduling cycle, the schedule did not work to the actual transmission power may be higher or lower than the forecast of the transmission power. Communication quality and efficiency, as is now required during the scheduling cycle, the forecast accuracy of transmission power determined. Low mis-prediction led to lack of power transmitted to the other prior to the link demand, such as the sound moves to increase during increased demand (if the resources can be re-assigned it). On the contrary, the high side of the transmission power required to predict the result in the use of forward-link is not sufficient. Scheduling of work who do not need to transmit power of the prediction accuracy of the forecast will be used to do as much as possible when the forecasts be improved.

IV soft-hands-off (soft handoff)

At any given moment, it is possible that all of the CDMA network distance units are in honeycomb-shaped unit 6 between the soft hands-off state. Free hand in the soft in the distance units 6 and 2 or more of the honeycomb-shaped cells at the same time communications. In the CDMA network using soft hands-off may be more cases refer to U.S. patent application No. 5,267,261.

The allocation of resources in soft when I let go the distance units 6, channel scheduler 12 to determine the soft hands-off of the participating units to meet the honeycomb-type (4) in number. In the beginning of each scheduling cycle, selector element 14 transmit the CDMA network, the action components of distance units 6 Group I channel scheduler 12. Action Components group contains six communications with distant station all the honeycomb-shaped cells form. In the typical implementation of the cases, in the action component

in the group each honeycomb unit and the main channel in the distance units encoding six communications. By one or more of the action component in the group honeycomb cell completion of an associate encoded channel high-speed data transfer. Channel scheduler 12 first choice to support high-speed data transmission of honeycomb-like cells. For the choice of honeycomb-like cell, channel scheduler 12 calculated for honeycomb unit to the maximum total resource. Action Components Group from all the options honeycomb-shaped cells form the largest allocation of resources to achieve the allocation of resources to the table. Because equation (4) can satisfy all the options honeycomb-shaped cells, from the smallest form the largest allocation of resources to allocate resources for all units to meet the honeycomb-type (4) number. Therefore, we can allocate the resources of the designated distance sets the maximum amount of 6 from the largest allocation of resources in the table minimum.

V. Coding Channel Group

Used in this invention prior to the link rate scheduling method and device can be used in data transfer rate can be changed in any communication system. For example, the invention can be used in the CDMA network, GLOB ALSTAR systems, time division multiplexing grid Proximity (TDMA) system, or Proximity frequency division multiplexing (FDMA) system. The note below, the use of the channel scheduler channel group concept, the present invention for the CDMA network systems, or other changes in rates of communications systems applications, or other implementation of the cases were within a point of view of this invention.

Comply with IS-95A standard soldier De CDMA system uses the distribution of links on the quarter prior to the phase shift keying (QPSK). In the base station 4, to provide the same data string to the I and Q modulators. Combined and transmitted I and Q modulation signals. Taiwan, six in the distance, the demodulator 364 demodulating the received signal into I and Q component. In conjunction with the

composition of a received demodulated output. The use of spread-spectrum based on this method of QPSK, CDMA networks 1.2288MHz system bandwidth in line with IS-95A standards contain 64 codes channels, each encoded symbol rate channels could be sent in 19.2Ksps.

In the base station by providing four different data strings of I and Q modulator allows doubling the number of coded channels, and in the distance Taiwan from the six do not make I, Q modulator output. In this mode, the base station 4 on the I modulator to provide a data string, for Q modulator to provide a second data string. Taiwan, six in the distance, individual decoded I and Q component. Therefore, IS-95CDMA network 64 coded channels doubled as 128 plain white silk yards channels.

In addition, the CDMA network, the number of coded channels to increase system bandwidth can be increased. For example, through integration with a wide section of the adjacent 1.2288MHz increased system bandwidth to 2.4576MHz can make double the number of coded channels. Moreover, by doubling the system bandwidth and providing different data strings of I and Q decoder, coding can be four times the number of channels. This invention can be used in the CDMA network, or any other rate transmission system, has nothing to do with the code number of channels.

Based on hardware configuration and system definition, this will be illustrated below, the main channel and sub-coding channel coding from channel coding focused on the common definition or distinction. For example, a system can contain 128 code channels, and various coding channel coding can be used as the main channel or vice-coded channels, depending on how the code channels may be specified. Designated as the primary channel coding channel coding can not be designated as Vice-encoding channel. In addition, the main channel and sub-coding channel coding can be selected from different tables out of. For example, a letter from the QPSK modulation composed of competing I generate the main code channels produced from the composition of the Deputy code Q channel. Whether the main channel and sub-coding

channel coding how to define the present invention can be applied.
Vice-coded channels can have different types, and each type has the same or different channel coding the main transmission capacity. For example, Vice-coding channel can contain the same 19.2Ksps transmission capacity channel coding channel as the main code. And Vice-encoded channels may include high transmission capacity (more than 19.2Ksps) channels and can have changes in rates of data transfer. This is one of high transmission capacity of a channel can be found in the case of U.S. patent application No. (unknown), entitled "Method and Apparatus for Providing High Speed Data in a Spread Spectrum Communication System (FAT PIPE)", 1996 Nian 12 Yue application, the designated to the assignee of this invention. The article on this as a reference document of this paper. This invention can be applied to any type and capacity of transmission channels.
I schedule the user specifies the maximum transfer rate depending on the number of considerations may be the limitation on the capacity to link one of the objectives and the system allows for all available capacity. In the CDMA network consists of a honeycomb-like modules and a distant station 6, a simple example, whenever the use of all available capacity allocated to distance Taiwan 6. All this work to minimum transmission delay. In a more accurate state may also reflect real CDMA network, a number of distance units 6 and the competition for resources that can be used. Distance in the competition between Taiwan 6, channel scheduler 12 before insertion of resources to the highest priority in the distance units 6. If you can use the resources allocated to a large part of the six units of this distance, then a large number of distant station to wait for six turns. Therefore, the allocation of resources to meet the equity objectives of the system, the number of resource allocation within the scope of the scheduled.
In this invention, from a honeycomb-like cells to distant data transmission station 6 can be encoded in one or more of the channels occur. Specified in the communication of the call set

the stage with a honeycomb-shaped cells of soft free to set the stage of the call. Known as the primary encoding channels to the first encoding channel specified distance units 6. In the typical implementation of the case, the primary coding channels with IS-95A channel characteristics of hearing services and has a channel rate of change can be 1 / 8, 1 / 4, 1 / 2 and 1 transmission rates. The best, when idle, the main code channels 1 / 8, transmission rates, when the transmission data, the rate of transmission of the one, but you can use 1 / 4 and 1 / 2 rate. 1 / 8 speeds can be used to send this, and then sends a request and control bits, and one of the rate can be used to transmit data and control bits. With the honeycomb-like cell communication during the period, the main coding channel is helpful for distance units 6 units 6 in the distant transmission of large amounts of data, may designate an alternate encoding channels.

In the representation of the implementation of the cases, when the Vice-encoded channels to receive data, in the main channel encoded data transfer occur. If the honeycomb cells to receive large amounts of data, then the channel scheduler 12 decided that it sent the data to other code channels, channel scheduling, No. 12 designate an alternate encoding channels. Then channel scheduler 12 that the designated Vice-coded channel identification code to the selector element 14. Selector element 14 routes the designated Vice-coding channel information to the service of the honeycomb cell base station 4. Coded in the main channel 50 on the forward link to transmit the information to the distant station 6. In the typical implementation of the case, especially the Vice-coded channels could be used in the 9.6Kbps transmission of data, you specify the 16 Vice-encoded channels and increased data transfer rate 163KbPs ((9.6KbPs × 17 code channels (or a primary encoding Channel +16 vice encoded channel)). Vice-encoded using the data transmission channel on the way to see in detail the case of the above-mentioned U.S. patent application No. 08/656, 649xxx. by the following implementation of the patients completed the second channel of the specified encoding.

In the first of the present invention, the channel scheduler 12 may designate an alternate encoding of individual channels. The implementation of the cases provide maximum toughness, which channel scheduler 12 may designate any Vice-coded channels to any of the distance units 6. In the typical implementation of the example code used to identify the designated Vice-channel protocol and used to identify the designated hearing the same service channel agreements. Based on IS-95A, using only 8-bit code to identify the specified hearing service channels. Therefore, the only bit by the Vice-coded channel identification code and transmitted to the distant station 6. For example, if the channel scheduler 12 specifies 16 Ling Dao, deputy code, then the 128-bit transfer to the distant station 6. Therefore, when standing in a box, channel coding almost 3 / 4 need to designate an alternate encoding transmission channel identification code to the distant station 6 (128-bit ÷ 172 bit / time-frame = 3 / 4 box). Managing the amount of coding that the main channel of the under-utilized.

In the second and better implementation of the case, the present invention can be applied to groups in the use of the concept of channel coding CDMA network. In this implementation example, the cluster marked as Vice-coded channels into the channel group Cm. In the representation of the implementation of the cases, there are related with the main coding channel 16 channel groups. Decode a byte code defined by the channel group, and contains only 0 or more vice-coded channels. During a honeycomb cell communication call setting phase, or with other honeycomb units of the soft-hands-off during the call set up, specify the distance units 6 a primary encoding and the transmission channel coding channel associated with the main channel group definition. Channel group definitions for the 16 channels in the group definition of the various channels group vice coded channels. The transmission period, the distance units 6 to send the definition of the specified channel group of 4-bit code, where the specified channel group for the next data transmission.

Channel scheduler 12 may designate non-overlapping channels, or groups linked to the distant station 6. Channels that are not linked group, does not specify any sub-code channels to the same unit more than a honeycomb-like a distant station 6. Therefore, do not link the specified channel group in the distance units 6 channels simultaneously, without links to the group vice coded channels to receive data transfer. For example, if the primary code channel 4 on the first 6 specifies a distant station with Vice-coded channels 33,49,65 and 81 of the channel group, and in the main coding channel coding channel 6 on the Deputy Vice-encoding specified with channel 35 , 51,67 and 83 of the channel group, can be encoded in the main channel and sub-coding channels at the same time data transfer.
In addition, the distance units 6 may designate a group of overlapping channels. For the overlapping channel group, specify at least one encoding channels to the same honeycomb unit is more than a distant station 6. Overlapping channels specified group in the distance units 6 can be received at different times of the specified channel group when the data transfer (using time multiplexing). However, the channel scheduler 12 may intentionally overlapping channels specified group, and the simultaneous transmission of data for the same number of distance units 6. For example, if the first channel in the main code on the first four distance units 6 to designate a deputy code that contains channels 33,49,64 and 81 channel group, and in the main code channel 4 channel 6 on the encoding specified with the Deputy Vice - coding channel 33, 51,67,83, Vice coding channel can be in the time slot T1, the distance specified for the first six on Taiwan Vice-encoded channel data transmission occurs, and the time slot T2, the first in the specified I 2 distance units 6 on the Under-encoded channel data transfer. However, the channel scheduler 12 overlapping channels specified group, and simultaneously send the same information to the distant station 6. In the above example, we'll send two distant station 6 data in two shared a distance, vice encoding the 6-channel 33 on the transmission. In this example, the distance units 6

while receiving overlapping channels in the group on the data transfer.

As noted above, the Deputy coded channels could have different types, and each type has a different and / or change in transmission capacity. To simplify the illustration, the following description to a certain type of Vice-encoded channels (the Vice-coding channel capacity and the main transmission channel encoding the same), the implementation in the following example, assume that in the CDMA network, there are 128 coded channels.

Table 1 designated for a primary coded representation of the channel definition of channel groups. As shown in Table 1, the main coding channel limit four labeled C0 to C15 with the 16 unique group of related channels. The channel group contains 0 or more vice-coded channels. In the typical implementation of the case, to retain C0 to become encoded with 0 channels channel group, to retain the number of C15 to become the Vice code that contains a large number of channels channels. If the channel with the primary encoding the relevant Vice-coding channel of the channel group selection can be defined in a number of cases of the completion of the implementation.

In the first implementation of the case, with the main coding channel coding channels associate symmetrical manner. By a variety of methods to be a method of channel group, the first Vice-encoded channel. For example, the first Vice-coded channels could be used as a primary encoding channel offset can be chosen at random. Then the next Vice-coded channels could be used to choose the sensor with the former deputy encoding channels of migration and to choose. For example, in Table 1 for the channel group of C15, the first Vice-coding channel of 25.25 can be arbitrary choice, or from the main code channel 4 21 be offset. Channel 4 associated with the main code for the next one coding channel coding for the former one channel offset relative to road 8. So for the main code channel 4, the Deputy coded channels for the 25,33,41,49,57,65,73, 81,89,97,105 and 113. Similarly, for the main code channel 6, the Deputy coded channels for

27,35,43,51,59,67,75,83,91,99,107 and 115. The first implementation of the Vice-coded channels to provide specific cases of a simple and effective method, but even across all the main code channels of distribution for vice coding. Best, select the first Vice-coded channels makes use of the Vice-coded with a flat distribution channels, for example, there is no Vice-coded channels, channel utilization than the other sub-codes are even higher.

表1-對於主編碼頻道4之頻道組的定義

編碼頻道組	在頻道組中的副編碼頻道 (在主動組件組中的一組件)
C0	
C1	33
C2	49
C3	65
C4	81
C5	33,49
C6	65,81
C7	33,49,65,81
C8	97,113
C9	25,41
C10	57,73
C11	89,105
C12	25,41,57,73
C13	33,49,65,81,97,113
C14	25,41,57,73,89,105
C15	33,49,65,81,97,113,25,41,57,73,89,105

In the second implementation of the cases, the use of a broken control (hash) function to define with the main channel of associate codes encoded channel. The following example shows the implementation of the representation of this configuration. For the Table 1 group definition channels and 12 sub-code channel associated with the main channel coding (see Table 1, C15). Secondly, in the broken control in Table 1 will be the first to link the various Vice-coded channels are listed in 12 times. For example, a Vice-coded channels listed 12 times, the Deputy Code Channel 2 listed 12 times, I can be and so on. For each primary encoding channel control table, from the broken randomly selected 12 Vice-coded channels, and placed in the main channel of the channel coding on a group of C15. C15 placed on the choice of Vice-coded channels are removed from the broken-

controlled table. In the Control menu, choose from a broken vice encoded channels, any previously chosen the same as the Deputy Vice-coding channel coding channel back into the broken-controlled table, and randomly selected a new Vice coded channels. If the main code channels and the main channel coding at the coding from the same channels available, then the main channel encoding the same choice is also Vice-coded channels back into the broken-controlled table. Selected and placed in the C15 in the 12 Vice-coding the same channel as the primary code channel with the particular associate encoding channels. This procedure ensures that there is no master code the same channel or vice-coded channels. Then the master code for all channels to repeat this process, but the same control table, select the broken Vice encoding channel exception, where the same control table pieces continue to shrink. The broken-control feature in all the main coding random channels at random and uniform distribution of Vice-coded channels. In the specified control function using the broken code channel, vice, we must be careful to make channel group may from time to link to or overlapping the end of television channels the characteristics of the group needed to be.

In the third implementation of the case, the definition of channel group makes the definition of a channel group of deputy encoding to use all available channels. Suppose there are two^{m}Sub-coding channels, and well-defined channel group makes the 1,2^{0}, 2^{1}, 2^{2}To 2^{m}Vice-encoded channel data transfer occurs. Table 2 for the eight Vice-coding channel of the simple example of an implementation of the cases of the representation of this configuration. C0 as the empty set. C1-C8 channels each contain a code, which corresponds to 0 to 7. C9 to C12 each contain 12 code channels. The Vice-coded in the C9 and C10 of the Vice-channel coding channel with, and expressed as C13. The Vice-coded in the C11 channel and in the C12 with the Vice-coded channels and expressed as C14. C15 contains the largest group of channels, or vice coding all available channels.

The third implementation of the two cases that need to ^{m} $^{+1}$Channel group to define two^{m}Vice-coded channels, and requires M +1 bits to send the specified channel group identification. For example, if the number of channels available for the Vice-coded 128, and then need 256 channels 8-bit groups and need to identify the specified channel group. Although the number of channel groups can be quite large, but the channel group definition is simple and does not require call setup phase of six sent to the distant station. This case also allows the implementation of the honeycomb-like cells at the same distance in all six units, or even the entire CDMA network using the same channel group defined and simplify the transfer rate of the specified procedure.

表2-使用第三實施例之頻道組定義

編碼頻道組	在頻道組中的副編碼頻道 (在動作主動組件組中的一組件)
C0	
C1	0
C2	1
C3	2
C4	3
C5	4
C6	5
C7	6
C8	7
C9	0,1
C10	2,3
C11	4,5
C12	6,7
C13	0,1,2,3
C14	4,5,6,7
C15	0,1,2,3,4,5,6,7

The idea of the other cases can be implemented to define encoding channels associated with the main channel group. For example, as shown in Table 1, all the honeycomb-shaped cells can be defined with the main Channel 4 on channel coding group. In the honeycomb unit, the distance units 6 can have a unique channel group definition, this depends on the primary code channel may be specified. Therefore, the main channel 6, channel coding group definition and for Channel 4 are different from the main code. The implementation of the

first and second group of cases described in the channel definition can be applied in this application.
In addition, honeycomb-like cell in the same, or even in all the CDMA network for all distance units 6 can be defined with the same channel group. In the third implementation of the cases described in the channel group definitions can be applied in this application. This configuration simplifies the rate prior to the link scheduling system because only a group of defined channels can be via the network used in all the distance units 6. However, according to the definition of this approach for the channel group to limit the channel scheduler 12 of the Vice-encoded channel availability, thereby increasing the forward link rate scheduling complexity. This invention applies to all channels Group definition.
Aside from how to define a channel group, in the first implementation of the case, the channel scheduler 12 can be present in a honeycomb-like units and distance units 6 high-speed data transfer between any of the specified channel group. For example, the distance units 6 units in three different honeycomb-like, and the first honeycomb unit can be designated C3, and designated by the second honeycomb cell C8, from the third honeycomb unit designated C14. Thus, with the specified channel group C3, C8, C14 scheduling CDMA system can be encoded in the main transmission channel to the distant station 6. This configuration needs to be transferred to other scheduling CDMA system, because the honeycomb-shaped unit can specify a different channel groups. In a better implementation of the case, the distance from the station 6 communicate with the honeycomb-shaped cells of all assigned the same channel group. Better managing the implementation of cases require less bits to transfer rate of a specific channel group identification, the Department because it only needs to send one other reason. The group specified in the channel constraints limit the availability of the Deputy coded channels and increase the forward link rate scheduling complexity.
When the receiving data transmission, distance units 6 demodulation to its structure in the specified channel group

for all the body's vice coding channel. For example, if the distant station 6 in a honeycomb-like unit of communication during the call set up to specify the main encoding Channel 4, and then specify the channel during the data transmission group C7 (see Table 1), then the distance along the main station 6 demodulation Channel 4 deputy encoding encoding demodulation channels 33,49,65 and 81, and then assembled from these five channels scheduler of encoded data channel is part of the frame. Specify the channel group C0 in the distance units 6 in the main code channel demodulation of the data transfer system because it contains an empty table C0. A free hand in the soft (soft handoff) during the distant station 6 with a number of honeycomb-like cells communicate with each other. For example, in communications, call set up phase, the distance units 6 units designated by a honeycomb-like primary encoding Channel 4. Subsequently, the distance units 6 to move to another location, and the honeycomb-like cells from the second main encoding specified channel 6. Then 6 demodulation primary encoding channel 4 and 6, in line with two honeycomb units relative to communication. If necessary, then the distance during the 6-in data transmission by the two honeycomb units specified channel group C7 (see Table 3), then the distance units 6 units from the first demodulator honeycomb channels 33,49,65, vice coding , and 81, and honeycomb-like unit from the second demodulation channels 35,51,67 and 83 Vice-coded. 6 In addition the distance Taiwan from the first honeycomb unit demodulating the main code channels 4 and honeycomb-like cells from the second primary code channel 6.

表3-用於主編碼頻道4及6的頻道組定義

編碼頻道組	在頻道組中的副編碼頻道(在主動組件組中的組件)
C0	
C1	(33,35)
C2	(49,51)
C3	(65,67)
C4	(81,83)
C5	(33,35),(49,51)
C6	(65,67),(81,83)
C7	(33,35),(49,51),(65,67),(81,83)
C8	(97,99),(113,115)
C9	(25,27),(41,43)
C10	(57,59),(73,75)
C11	(89,91),(105,107)
C12	(25,27),(41,43),(57,59),(73,75)
C13	(33,35),(49,51),(65,67),(81,83),(97,99),(113,115)
C14	(25,27),(41,43),(57,59),(73,75),(89,91),(105,107)
C15	(33,35),(49,51),(65,67),(81,83),(97,99),(113,115),(25,27) ,(41,43),(57,59),(73,75),(89,91),(105,107)

When the scheduler from the Channel 12 schedule, the data only in the Vice-coded channels transmitted. In a better implementation of the case, with full-rate transmit all of the Vice-coded channels.

Deputy coded data transmission on the channel than in the primary coding channels are effective, because the main code line channels also carry the CDMA system in need of support needed for managing a number of characteristics of bit.

In a better implementation of the cases, specify the channel group in the main code channel communications with distant station 6. In the scheduled start of the cycle when the honeycomb unit to send the next data transfer for the channel group identification code. For 16-channel group, only four bits to send the specified channel group identification. Can establish an agreement made in the main channel of the encoded channel coding when the frame some of the bits can be identified for the specified channel group to be reversed.

VI. Coding channel is re-transmission of erroneous frames

Identification of the specified channel group is sent to distant units 6, and was subsequently appointed Vice-encoded channels in the pre-determined number of data transmission occurs when the box. Inevitably, in the main channel coding

channel coding when the box is sometimes as far away Taiwan to receive six errors. When this happens, the distance do not know if the 6-channel group identification code specified. Shows four cases can be implemented in an implementation of the cases to solve this problem. In the following the implementation of the case, the assumption by the honeycomb-shaped unit to receive the specified channel group identification code and the specified channel group on the data transfer between the 2:00 frame processing delays. K by the time frame when the main channel of the honeycomb-like coding unit to send the specified channel group identification code, and when in the time frame specified channel on the Deputy encoding data transfer. The following implementation of the cases can be applied by the honeycomb-shaped unit to receive the specified channel group and channel group on a specified data transfer processing delays between the different length of time or from J to-J examples of inter-process changes.

In the first implementation of the case, the honeycomb-like cells to re-transmit the data corresponding to the time period for which the distance units 6 did not know the specified channel group. Distance units 6 to send a message to the honeycomb-shaped cells EIB instructions coded in the main channel when the channel coding frame k for the wrong receiver. Honeycomb-like unit and then to the main transmission channel coding channel coding when the frame k, and was subsequently appointed Vice-coding channel coding channel is transmitted frame k +2, Taiwan 6 Department because of the distance do not know when the time frame k +2 specify the channel group.

In the second implementation of the cases, if the main coding channel coding channel k when the box to receive an error, then the distance used in the former encoding the 6-channel time-frame k-1 in the channel group identification demodulation in the time frame k +2 The data transfer. If the time-frame k-1 in the specified channel group k in the time frame specified in groups of different channels or do not link, then this case can not account for the implementation of a

good effect. For example, back to Table 1, if k-1 in the time frame specified when the channel group, C13, and k in the time frame when the specified channel group C14, Section C13 using channel k in the time frame when the demodulated data transmission distant station 6 will receive the wrong data.

In the third implementation of the cases, if the main coding channel coding channel is to receive an error frame k, then the distant station 6 using the code with the largest number of Vice-channel demodulation in the time frame channel group in the data transfer k +2 . If the largest group contains all available channels to the distant station designated deputy encoding 6 channel, then this implementation of the cases of the operation reasonably well. For example, the C15 in Table 1 meet this condition, the Department because it is included in the channel group C0 to C14 in all of the code channels. Efficient coding channel coding channel demodulation time frame for when the box is a subset. The shortcomings of the implementation of cases in Taiwan, six in a distance require more processing. Also, you can distance units 6 may determine the demodulation of the coded channel is the box that increase effective, you need to store large amounts of data. If the time-frame for each encoded channel using its own CRC byte encoding time-frame for each encoded channel, the distance units 6 through the channel in each demodulation code box on the implementation of the CRC check when deciding the validity of coded channels when the box. In addition, if the application a set of CRC bits coding the entire data frame and when the box in all distribution channels encoding CRC bits, then the distance units 6 can be encoded in the demodulation of different channels when the box under the combined implementation of the CRC check. Finally, the distance units 6 can store all of demodulating the time-frame encoding channels to inform the main channel when coding errors honeycomb frame unit, and wait for re-transmission of the specified channel group identification code.

In the fourth and better implementation of the case, in the

time frame k, the honeycomb-like cells used in the main code channel k, when the box of the specified channel group identification code, said time-frame k +2 of the specified channel group identification code. If the code channel k when the box to receive errors, then as the third implementation of the cases, distant station 6 using the largest group of demodulation channel frame k +2, when the data transfer. However, because the specified time-frame k +2 to the primary coding channels are also time-frame k +2, when the main transmission channel encoding, so the distance units 6 may determine the encoding demodulation box what channel is valid. Vice-coded in the designated channel from the channel demodulation before the determination of the main code, you may need a box for additional data storage components. For each main channel coding system with 16-channel group in the present tense of the box to send the specified channel group identification code system requires only four additional bits can be.

Separated by 2:00 in the box away when the frame 2 encoded channels to send the specified channel group identification code to provide redundancy and time diversity. Unless the code in the main channel when the channel coding frame k and k +2 are receiving an error (this rate was quite low), or can be correctly demodulated data transfer.

VII. Demodulation and decoding of multi-coding channel

A free hand in the soft and multi-path signals can be multi-coding channel demodulation case, see U.S. Patent No. 5,109,394, entitled "In the CDMA cellular telephone system in the shape of modular sub-set of receivers," in this article I of the present invention designated transferee people, and the inclusion of that reference to this article. U.S. Patent 5,109,390 in the case, the receiver can be described in further expansion of the present invention to receive multi-channel encoding groups.

Figure 4 shows the invention of the distant station 6 of the demodulator 64 and decoder 66. Honeycomb-like unit from the transmission RF signal reception antenna 60, and provided to receiver 62. 62 receiver RF signal amplification

and filtering, the RF signal down to baseband frequency, and quantify the baseband signal into digital bits, the digital base-band signals to the demodulator 64. Demodulator 64 contains at least one search type receiver 100. Search for receivers 100 applications appropriately short PN_IAnd PN_QYards and in the case of U.S. Patent 5,109,390 in the manner described in the Walsh code demodulated digital baseband signal. From search-based receiver 100 provided to the decoding of the demodulated output of 66. In the decoder 66, the descrambling device 110 applies the specified frequency to the distant station six yards long PN descrambling the frequency of the demodulated output. Then de-interlacing device 112 and then the frequency of the descrambling data sorting, and de-interlacing of data through the Viterbi decoder MUX114 point to 116. Viterbi decoder 116 to spend learning the Department of decoding the data de-interlacing, and to provide decoded data to CRC check element 118. CRC check element 118 displays decoded data CRC checking, and offers the box to receive encoded channel is not the wrong part of the data storage device I 68.

Multiple demodulator 64 can be configured to implement cases. In the first implementation of the case, for the distance units for the six groups receiving the various coding need a search channel receivers 100. The search receivers 100 include at least one correlator 104, the search-type receiver 104 as the search for a general finger-type receiver 10. For each group needs at least one encoded channel correlator 104. The correlator 104 can be applied only for a short PN code and the distance units of the six designated to a specific Walsh correlators 104 only 62 yards from the receiver digital baseband spread spectrum signal solution. Related to the transmission device 104, the final honeycomb-like cells in the exploration for. In the honeycomb cell, coding, application-specific data before the encoding to transmit data channel to be the only Walsh code spread spectrum. Further to a specific representation by the designated unit of the honeycomb only to be a short PN code spread spectrum.

Not in all the time in both the use of all of the correlator 104

and in the distance for all searches within the 6-receivers 100. Moreover, only decoded by the decoder 66 has been designated as the distance units 6 receivers 100 from the search output. Did not know not help Taiwan six specified distance correlator 104 and search-type receiver 100.
General, the better implementation of the case, the distance units 6 demodulation decoding has been designated the body to its structure and does not specify the encoding to other encoding channel channel. One-way distance of the mobile station 6 is particularly important in terms of this characteristic, the Department because of the need to maintain battery power and extend the operational lifetime of the unit.
Correlator 104 to the designated distance Taiwan from the first application to the six designated PN correlator 104 yards short of the 62 errors coming from the receiver baseband spread spectrum signal solution. Specified short PN codes used for the cell in the honeycomb-like solution to the data frequency of the same short PN codes. Basically, the short PN codes and specified in the honeycomb cell used in the time existed between the short PN code offset to offset through the link 50 prior to the transmission delay and generated by the receiver 62, the time delay. Correlator 104, followed by application of the distance Taiwan from the six designated to that correlator 104 decisions Walsh codes, spread-spectrum solution from the first operation the output operation of spread spectrum solution. Walsh code corresponds to the specified encoding to the specified channel Walsh code, while the coding channel demodulation by the correlator 104. By the combination of device 106 with receiver 100 within the same search-correlator 104 from the designated solution of spread-spectrum bit, and provided to decoder 66.
In the second implementation example, a search-type receiver 100 can be used to demodulate the specified distance to all the code sets six channels. Need a buffer from the receiver 62 of the digital baseband signal. Then search for a 100-type receiver demodulator channel is a coded frame, and provides

an output to the demodulation decoder 66. The implementation of the cases need to search receivers 100 in order to implement than the first 100 cases of search receivers even higher speed operation. In fact, the factors that increase the speed of the dual receivers allow the search speed of 100 half.

Decoder 66 receives data from the search receivers 100, demodulated output and perform a variety of operations, these operations with the honeycomb-shaped cells at the transmission perform complementary. 66 can decode a variety of competition cases have to be configured to implement. In the first implementation of the case, provides information from the search receivers 100, demodulated output to the frequency of different descrambling device 110. Descrambling device 110 applies the specified frequency to the distant station six yards long PN spread-spectrum solution to the demodulated output, and to provide descrambling information to the frequency de-interlacing device 112. De-interlacing device 112 to the frequency in the descrambling unit honeycomb-like re-sorted in reverse order execution frequency data descrambling the bit. De-interlacing feature provides time diversity, this can be through the spread-spectrum for the former to the transmission link 50 into an error by the improved hearing under the bundle product decoding stack implementation. By MUX114 multi-de-interlacing of data and provided to Viterbi decoder 116. Application of Viterbi decoder 116 decoding using prescriptive way of de-interlacing of data, and to provide decoded data to CRC check element 118. CRC check element 118 implement decoding of data CRC check, and provide the received encoded frame of the channel is not part of the wrong data, to data storage device 68. In a better implementation of the cases, the use of a Viterbi decoder 116 decode all the encoded channels to send data.

In the second implementation of the case, through the MUX114 multi-search type from the demodulation output of the receiver 100, and the frequency by a descrambling device 110, a device selector element 112 and a Viterbi decoder 116

to be addressed. Use a set of hardware to demodulate all of the coding channel is needed for box which makes the hardware to a minimum. Once again shows that the hardware time multi-tasking needs to operate at high speed hardware. In this invention, in at least four different models in a model using the demodulator 64. In the first mode, use the demodulator 64 demodulate coded by a channel from one honeycomb cell to send signals. In this mode, only one search type receiver 100 for demodulating the received signal. In the specified search type receiver 100, the specify a different correlator 104 for each received signal path. Correlator 104 for the designated use of short PN codes and Walsh codes the same. However, the correlator 104 for the designated use of short PN codes have a different time offset to compensate for the different multi-path delay. Search correlator 104x continuing the search has not been designated to the correlator 104 of the strongest path. When the newly discovered multi-path signal strength exceeds a predetermined threshold, the search correlator 104x this distance units 6. Then the distance units 6 designated the newly discovered multi-path I correlator 104.
For example, the distance units 6 through the main code channel 4 and a honeycomb cell communication. Distance units 6 to specify the main encoding Channel 4 to search receivers 100a. 100a in the search-type receiver, the correlator 140 in the main code designated to receive the signal on channel 4 different multi-path. For example, the correlator 104a to specify the path to the first, related to the second device 104b can specify multiple paths, and so on. By the combination of device 106a from the specified combination of the output of correlator 104 and provided to decoder 66. In the decoder 66, by the descrambling device 110a descrambling frequency band from the search receivers 104a demodulation output by the de-interlacing device 112a to record, and by MUX114 point, learning to spend from the Viterbi decoder 116 to decode , and by the CRC check element 118 to be checked. From the CRC check element 118 of the most error-free data available to the data storage device

68.
In the second mode, use the demodulator 64 demodulate coded by a group of multiple channels from multiple honeycomb units to send signals. In this state a free hand in the soft place in the right distance units 6. In this mode, designate the whole group of receivers 110 to a search. In the group designated in the various coding channel receivers 100 to search for at least one correlator 104. The correlator 104 applications only a short PN codes and the corresponding honeycomb unit and the unique Walsh code channel number (for specific correlator 104 assignee) solution spread-spectrum receiver 62 from the base frequency of the output. Device 106 by the combination of integrating people from the designated output of correlator 104. Combination of signal improvement in the group of multiple encoding redundant signal transmission channel.
For example, the distant station 6 in soft let go of, and through the main channel coding unit 4 and the first honeycomb communications, and coded by the main channel 6 and the second honeycomb cell communication. Distance units 6 specify the same search-type receiver 100, at least the correlator 104 to two primary coding channels 4 and 6 of the coding channel. For example, the distance units 6 correlator 104a to specify the main encoding channel 4, and specify the correlator 104b to the main code channel 6. The 104m devices 104c related to distance Taiwan from the six designated to be the primary coding channels 4,6 in the strongest multi-path by the combination of device 106a associated with the specified device 104 from the estimated value of improved data to provide an estimate, this estimate provides I decoder 66. Decoder 66 and the first mode of application of the same methods described in the search type from the receiver decodes the demodulation decoder 100a.
In the third implementation of the cases, the use of demodulators 64 demodulate coded by the multi-channel group from a honeycomb-like unit to send signals. When the high data transfer rate, this honeycomb-like cell is to transmit data to the distant station 6 occurs in this state. Each group

contains an encoded channel. In this mode, specify a search type receiver 100 to each group of code channels. In the same search-based receiver 100 within the correlator 104 is assigned the same short PN codes and the same Walsh code. In various search-type receiver 100 within the correlator 104 is assigned the same short PN code, but different Walsh codes, the Department because the search-based receiver 100 are demodulated different encoding channels.
In this mode, as in the first mode, the search-type receiver 100 perform the same function. Basically, the code channels in the group designated to at least one correlator 104. Receivers in the same search in the correlator 100 to 100 specify the encoding of the signals received on the frequency derivative of different multi-path, where the signal is specified to the designated search receivers 100 to receive the coding channel. Thus, in the same search receivers 100 each correlator 104 within the same short PN codes used the same Walsh code. In the same search-based receiver 100 within the correlator 104 for the designated short code PN offset with the time to explain the multi-selector element in the different delay. By the combination of device 106 with the search-type receiver 100, correlator 104 from the specified output, and provided to decoder 66.
For example, in a honeycomb-like cell different from the call set up phase, the primary code channel 4, I specify the distance units 6, and then in the high-speed data transmission period, the specified channel group C7. Now please refer to Figure 1, code channel group consists of four Vice-coding C7 channels 33,49,65 and 81. 6 distance units specified five different search-type receiver 100 to the 5 coding channels. For example, the distance units 6 can specify the search receivers 100a to the main code channel 4, the search-type receiver 100b to the Vice-coding channel 33, the search receivers 100c (not shown in Figure 4) to the Vice-coding channel 65, I can analogy. 100a in the search-type receiver, the correlator 104 designated to channel 4 in the main code of the signal received on a variety of different paths. For example, the correlator 104a may be the first multi-path,

related to the second device 104b over the specified path, I can be and so on. By the combination of device 106a associated with the specified device 104 from the output. Decoder 66 to the right from the search type 5 specified the demodulation of the output of the receiver 100.
In the decoder 66, by the descrambling device 110a descrambling frequency band from the search receivers 100a of the demodulated outputs from the de-interlacing and re-sorting device 112a. Similarly, from the search-type receiver 100b of the demodulator output from the descrambling device 110b descrambling frequency band and by the de-interlacing device 112b documented. Five separate descrambling frequency device 110 and de-interlacing device 115 with the specified search type from 5 to 100 5 demodulated receiver output. From 5 de-interlacing device 112 de-interlacing of data based on pre-order via MUX114 multi-industry operations, and provided to the Viterbi decoder 116. De-interlacing of data followed by the Viterbi decoder 116, decoding, and checked by CRC check element 118. CRC check element 118 provides information from the error-free data to the data storage device 68.
In the fourth mode, use the demodulator 64 to demodulate coded by the multi-channel group from the number of honeycomb-like cells to send signals. Honeycomb-shaped cells containing several soft hands-off in the distant station 6 occurs for a state, and in the honeycomb-like cells from a number of high-speed data transfer rates receive data. The group containing more than one coding channel. In this mode, specify the search type receiver 100 to the various coding channel group. In this mode, the search-type receiver 100 displays the same pattern with the second function. In the same search-type receiver 100, at least designate a correlator 104 for each code channel of the group. The correlator 104 using the unique short PN codes and right should be coded Lingdao honeycomb unit and the only Walsh codes, the coding channel correlator 104 for a particular assignee.
For example, during a free hand in the soft distant station 6 through the main code channel 4 and the first honeycomb cell

communication, and through the main coding channel 6 and the second honeycomb cell communication. High data transmission in the next period, the distance units 6 specified channel group C7. Refer to Table 3, C7, group vice encoded with four channels (33,35), (49,51), (65, 67) and (81,83). 6 distance units specified five different search-type receiver 100 for the five groups coded channels. For example, the distance units to form 6 search receivers 100a to the first group of the primary coded channels (4,6), specify the search type receiver 100b to the second group of Vice-encoded channels (33,35), specify the search type receiver 100c (Figure 4 not shown) to the third group of Vice-encoded channels (49,51), Balance and so on. In the search receivers 100a, at least designate a correlator 104 for each code channel of the group. For example, the distance units 6 may designate a correlator 104a to the main code channel 4, and specify the correlator 104b to the main channel 6 cheat codes. The 104m distance of the correlator 104c may be designated for the primary encoding the 6-channel 4 and 6, the next most powerful multi-selector components. Combination of device 106a from the combination of search receivers 100a from specified within the correlator 104 output. From the five search receivers 100, demodulated output available to the decoder 66.

Decoder 66 receives data from five search receivers 100, demodulated output, and the application and the third model in the same way, decoding the data. Basically, the separate descrambling the frequency band from 110 descrambling 5 search receivers 100 of the receiver demodulator output by separate de-interlacing device 112 to be recorded by the MUX114 many workers, compared to traditional peacekeeping Viterbi decoder 116, decoding, and checked by CRC check element 118. CRC check element 118 provides information from the error-free data to the data storage part 68.

The group in a multi-channel data transmission, encoding and decoding of the discussion of the demodulator can be expanded to contain three or more of the base station sets the

soft hands-off in the distance. Basically, each channel requires a separate code base, search-based receiver 100. For example, the channel group C7 (see Table 3) of the four group vice encoded channel needs four search receivers 100. Moreover, in a group of channels specified in the various coding style to the same search at least one receiver 100 different correlator 104. Combination and the decoder output from the correlator 104 to get the code channels in each group to send data.

Figure 4 contains the following steps in the representation of demodulator 64 and decoder 66 hardware can be used in other mode. For example, configurable demodulator 64 and decoder 66 to demodulate a group of coding in a multi-channel decoding the transmission of encoded channels, which the group contains a coding channel, and the data is not from the same honeycomb cell transfer. The third model is similar with the above, but the search-type receiver 100 corresponding to different types of transmission designated honeycomb-shaped cells pN yards short. In addition, you can configure demodulator 64 and decoder 66 for demodulation and decoding in a multi-cluster transmission channel decoding encoded data, which the group contains a different number of coded channels. This is the fourth model of the above changes in office. Using the demodulator 64 and decoder 66 of these and other models can be regarded as the views of the present invention within.

VIII.CRC bit

Based on IS-95A, CRC bits appended to each data part of the proper distance Taiwan from 6 to detect errors when the cabinet. CRC-bit is based on the IS-95A produce specified in the CRC polynomial. In particular, for 96Kbps data transmission rate, the specified polynomial $g(x) = x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^4 + x + 1$. For each data part, the additional 12 CRC bits. In this invention, CRC can increase or decrease the number of bits, depending on the required degree of detection may be determined. More of the CRC bit to allow greater certainty to detect the time-frame errors, but the need for more executive information. Conversely, less time-frame

CRC bit to reduce the error of certainty, but it requires less standing message.

In this invention, in which more than during the high-speed data transmission channel coding may be implemented for at least two cases of multiple code channels to generate the CRC bits. In the first invention, the data part of the CRC bits attached to their own group, this is similar with the IS-95A standard. The implementation of the cases the need for more executive information, but allows the data in each part of the error was detected on the time-frame. Only the re-transmission of erroneous data received in part.

In the second implementation example, a time frame specified in the encoding of the data transmission channel counter by a CRC generator to be encoded. CRC bits can be generated in multiple mode in a mode of delivery. In the first mode, the data frame is divided into parts, such as the above-mentioned data. CRC bits are split and attached to various parts of the data. Therefore, all cheat codes of data channels when the box contains a location and some of CRC bits. In the second implementation of the cases, in a time-frame for the transmission channel encoding CRC bits. In addition to channel coding, when the final frame, all channels of encoding the data when the box contains only part. Finally when the box contains the CRC channel coding bits, and some data. The second model provides CRC bits of time diversity and improve the time from the distant station 6 box error detection.

Taiwan, 6 in the distance, and then assembling the data encoded channel location and time frame CRC bit. In the second implementation of the case, the distance units 6 may determine whether all of the boxes are correctly coded channel is received or whether there has been one or more of the time-frame errors. Distant station Channel 6 is not decided to code box when the box when you receive those errors. Therefore, the short time-frame for frame error indicator indicative of the need for cellular-like cells in all re-transmit the time-frame encoding channels. The advantages of the implementation cases of the second data frame for use

only small number of CRC bits.
For example, suppose in the 12 coded channels high-speed data transfer occurs. In the first implementation of the case, the 12 sites in various parts of the data with its own 12 CRC bytes. For the 12 data part of a total of 144 CRC bits needed. This 144 CRC bits allowed in each box on the coding channel is to detect errors when the box. Therefore, if a particular code channel coding channel is to receive an error box, simply send the wrong again when the box.
For the second implementation of the cases, applied a set of CRC bits coding the entire data frame. The best, the required number of CRC bits used in cases of less than the first implementation of the CRC bits of the total number of restrictions on the use of the CRC bits of at least 12 but less than 144. Because there are about 12 or more data bits, then the need for more CRC bits to allow greater certainty when the next frame to detect errors. Assuming 24-bit CRC value required to allow applications to detect when the degree of quasi-frame bit errors, and then 24 CRC bits CRC can be divided into 12 boxes, each CRC box contains two CRC bits. 12-bit CRC is attached to a position in the various parts of the data. In addition, channel coding can be a time-frame for transmission of 24 CRC bits. Taiwan, 6 in the distance, and then combined the data location and 24 CRC bits. Distance units 6 to decide whether all the 12 channels when the boxes are correctly coded to receive. A time frame, if the instructions wrong, then the distant station when the box is not the decision coding channel which receives an error when the box. Therefore, honeycomb-like cells by the re-transmission of all 12 coded channels when the box. For managing the message to save 120 CRC bits, distant station 6 can detect the time-frame errors, but no cases in the first implementation of the precision. The second implementation of the cases require less time managing messages and channel coding redundancy in the box to achieve a compromise between the re-transmission.
IX. Prior to the link rate scheduling clock
As close as possible will be used to predict the time predicted

by the improved scheduling of work is not needed to transmit the power of prediction accuracy. During the delay, from time to accurately predict the use of time, can change the network state. For example, the voice of the user can start and end of conversation, the user can see into the network or out of the network, or the channel status can be changed. As a delay by limiting the time frame from a small number of work who do not need to schedule the transmission power of prediction accuracy is adequate needs of the present invention. In a better implementation of the case, the processing delays for the four time-frame or less.
Channel scheduler 12 can be carried out in a short period forecasts, for example, through the maintenance of a short interval scheduling to improve forecasting accuracy, and allow the channel scheduler 12 in the former to the link when necessary, respond quickly to change. In the representation of the implementation of the cases, each time frame is about to predict, and each time-frame for resource allocation and reallocation, and the transfer rate on the schedule specified time-frame in the distance to the transfer station 6.
Figure 8 prior to the link specified in this invention, when the rate schedule into account the typical description. In the time a temporary account when measuring the state of the entire CDMA network, and the 300 in the box to send to the channel scheduler 12. In the representation of the implementation of the cases, CDMA network status can be included in the honeycomb-like unit for scheduling the work of all the residual power to the user scheduling the amount of data transmitted, the distance units 6 of the Action Components groups, each user's scheduled delivery of each element of energy, and the honeycomb-like cells used in the encoding of the transmission channel. K +1 in the time box office, channel scheduler 12 to allocate resources and to disseminate information to the base station controller 10 within the selector element 14 (box 302). Channel scheduler 12 can be carried out in the allocation of resources for the specified type or a transmission rate of the distribution of transmission power. If the channel scheduler 12 assigned

transmission power, the selector element 14 transmit power calculation based on the distribution of the specified transfer rate, and the distant station 6 requires that every element of energy. K +4 in the time frame specified in the transfer rate. In the time frame k +1, the energy transfer rate and 14 to send the specified data frame schedule, this in the time frame k +2 in the selector element 40 will be sent (box 304). And in the time frame k +1, the selector element 40 to receive the specified transfer rate on the schedule and from selector element 14 of data frame (box 306). In 308 in the box at the time-frame k +2, selector element 40 transmit the time-frame k +4 specified time frame k +2 of the channel group identification code to the code in the main channel of the distance units 6. 310 in the box in, during the period when the frame k +3, base station 6 receives the data frame, and decided to designate the channel group identification code. Then, if necessary, the distance units 6 and then configure the hardware to receive access to high-speed data transfer. 312 in the box, the counter k +4 Department at the time, for a specific distance to the main encoding the 6-channel and sub-code channels to transmit data.

In the representation of the implementation of the cases, in the honeycomb-like cells from the need for information for the channel scheduler 12 receives the time to the designated transfer rate of data transmission, processing delay between the time when the cabinet for four. K in the time frame, the channel scheduler 12 receives information from the honeycomb-shaped cells. Counter k +4 in the time when the honeycomb unit to send the main code in the specified channel and sub-coding channels of information to the distant station 6. For the IS-95A standard consistent with the CDMA system, the delay time frame that 90msec delay. In the representation of the implementation of the case, the four processing delay in the time-frame indicated 80msec delay. This delay allows a relatively short period required to transmit power of playing the forecast can achieve the appropriate accuracy, and the forward link communication, and does not produce enough to decline in quality. Moreover,

for the need of the work is not scheduled the start of transmission power projections in this invention is not very crucial, because with the Department Scheduler to monitor 12 prior to link the sustainable use and redistribution for dynamic scheduling work resources.

Representation of the implementation of the above described cases that a configuration of this invention. From the above description can be conceived prior to the links when a point of order scheduling rate changes into account, this are all within view of this invention.

Transfer rate with the specified schedule information can be transmitted to multiple cases of the implementation of cases in the implementation of a distant station 6. In the first implementation of the case, the forecast for the bits stored in the main channel of the encoded channel coding when the box some of the bits. In the second implementation of the case, through the use of separate letters messaging scheduling. As long as there are new specified data transfer rate, then the written message can be sent to the distant station 6. The idea of using the above can be implemented in other cases the change in schedule or in combination to send the information to other implementation of the cases, and these cases are in the implementation of the present invention point of view.

Figure 9 shows the rate schedule prior to the link and this invention of high-speed data transfer. As noted above, with the honeycomb-like cell communication during the distant station to designate a primary code channel 6. In Figure 9, when idle, the main coding rate of transmission channels 118, and when to send data, places one of the rate of transmission. Transmission distance will be the product of the 6-piece (backlog) of data indicated by solid lines, and the number of coded channels when the box said. Coding channel coding when the counter is equivalent to the number of channels multiplied by the time required to send all the data frame number. For example, by sending an encoded channel coding channel is when the box after 20 boxes, or by 4 encoded channels transmitted over five time-frame. Although the main

coding channel capacity in the Vice-coded micro-channel capacity, channel coding the main line because the executive (overhead) bits with the rules, in order to simplify matters, in the following examples do not consider differences in the meantime. The following note was on the implementation of the above-mentioned cases, each of which when the box to link the rate of pre-implementation schedule. The following examples can be used for each time-frame for the implementation of K months prior to the link rate scheduling example.

In the example shown in Figure 9, the distance to designate a primary encoding the 6-channel, but the honeycomb-shaped cells without any data can be transmitted to the time-frame 1 and 2 of the distance units 6. Thus, in the main channel in the honeycomb-shaped unit code of 1 / 8 speed transmission of data. Box 2 in the time period, the honeycomb-like unit, when receiving two encoded channels box to send to the distant station 6. The primary coding channels, honeycomb-like cell transmission in the time-frame 3 and 4 on a code channel to in the time-frame 3 at the end of the plot pieces back to 0. Note that in the main code channels to transmit data without any delay in the schedule. Box 2 in the time period of the data received is only in the time frame three main coding channel real-time transmission. In the main channel real-time encoding to send any units to the distance from the honeycomb units six letters, and speed away. For example, TCP informed of the results of about 40 bytes, and the application of the table header compression can be adapted to a channel when the frame coding. TCP this can be a time-frame coding channel coding the main transmission channel immediately.

Box 5 and 6 during the period of time, when the idle and wait for data, you can 1 / 8 the rate of transmission honeycomb-like cells. 6 in the time frame during the honeycomb unit to receive a lot of data to send to the distant station 6. In the time-frame 7, channel scheduler 12 from selector element 14 to receive queue size information, to gather other relevant information and network status (for example for the

honeycomb-shaped cells of the scheduled tasks used to send the total residual power) , allocate resources, and the transmission of information sub-selector element 14. In this example, the channel scheduler 12 from Table 1 in the specified channel group of C7, the table contains the four Vice-coded channels. In the time-frame 8, the honeycomb-shaped cells along the channel in the main code to the specified distance units 6 channel group, lined up to send from the Vice-coded channels. In the time-frame 9, the base station 4 consecutive coded in the main channel to transmit data, and will download to when the box plot pieces. 9 in the time frame during the distant station 6 receives the second channel when the frame coding, and identify the specified channel group, and configure their hardware to receive access to high-speed data transfer. In the main code and the channel 10 and 11 in the time frame of the four Vice-coded channels to generate high-speed data transfer.

In this example, eight in the time frame during the period from the work schedule did not link the former to the increased demand. In the time-frame 9, the channel scheduler 12 for a small forward link capacity can be used to schedule the work of allocating resources. Channel scheduler 12 decided to channel coding with dual-channel group of deputy C6 whether the additional demand for the release of certain capacity. In the time frame 10, including two encoded channels, the new channel group to the distant station 6 transmit. In the time frame 11, the distance units to receive six new channel group. In the time frame 12, honeycomb-shaped unit to transmit data to enable adoption of a new channel group.

Moreover, in this example, nine in the time frame during the period from the work schedule did not link the former to the increased demand. In the time frame 10 during the forward link has more capacity, channel scheduler 12 has four Vice-encoding specified channel group of C7 to the distant station Channel 6. In the time-frame 11, transmit the new channel group identification code to the distant station 6. In the time frame 12, the distance units 6 to receive the new channel

group identification code. In the time frame 13, honeycomb-like cells through the new channel to transmit data so that group.
In the time frame 12 during the channel scheduler 12 to achieve the event of scheduling the transmission completely, the the team was idle, and only two encoded channels 15 in the time frame when the frame the rest of the data. In the time frame 13, channel scheduler 14 via the selector points to honeycomb components, honeycomb-shaped unit cell with the new channel group C3 of the identification code to the distant station 6, the channel group C3 only contain a coded channel. In the time frame 14, the distance units 6 to receive the new channel group identification code, and re-configure their hardware. In the time frame 15, honeycomb-shaped unit to send two boxes the rest of the coding channel is passing through the new channel group.
In the time-frame 13, which was idle for several line-up, channel scheduler 12 points in the honeycomb unit, to through selector element 14 transmit the new channel group C0 of the identification code, which contains the 0 coding channel. In the time frame 16, the honeycomb unit to use the new channel group. Already sent all the data, the honeycomb-shaped cells of 1 / 8 the rate in the time frame of 16 primary coding channels to transmit data, while the idle and wait for more data.
The above example shows that the time data can be used as a honeycomb-like cells (Figure 9, when the box 6) and high-speed data transfer (Figure 9, when the frame 10) when the box between the four processing delays. For example, in this example each time the box adjustable transfer rates, makes it completely each time before using the link box.
VIII. The designated priority
In order to make forward-link signals can be optimized, which has scheduled the work of the resource based on the priority of distance units 6 units allocated to the distance 6. Forward link transmission power, the first appointed to the highest priority in the distance units 6, and finally designated to have the lowest priority in the distance units 6. A number

of factors determine the distance units can use the six priorities. The following discussion details a number of solid elements of the representation that these priorities can be specified with or without consideration. Can also consider other factors, and this all within a point of view of this invention.

Taiwan, six in the distance between the decision to be an important factor in order of priority for the need to distance Taiwan 6 yuan for each transmission of the energy. Honeycomb-like cells in the distant side of the Taiwan experience of reverse channel 6 or those that require the performance of the state-bit quasi-every element of the need for more energy, the Department because of the distance from the honeycomb unit to the transfer station 6 depletion of large and / or a higher Eb / No. On the contrary, almost honeycomb-like cell location of the distant station 6 (ie, almost as a honeycomb cell base station 4) for the same performance every bit quasi-yuan is now less the energy. In fact, for the same amount of transmission power can be transmitted to the distant station 6 symbol rate and transmission wear and tear, and Eb / No is inversely proportional to. For example, in 38.4Kbps Taiwan under the support to the first distance data transmission, six of the total surplus power, if the distance to the second station 6 is about the transmission of wear and tear 6dB, far more than the first station 6, state, or if second distant station 6 requires 6dB of Eb / No, compared with the first distant station 6 is also high, only supports 9.6Kbps, to the second station 6 of the data transmission distance (1 / 4 Symbol rate). The best first distance units 6 transmission, because the transfer rate for a given case, the consumption of fewer resources, it requires less energy for each of the yuan.

Now please refer to Figure 1, the distance units 6a, 6b near distance Taiwan 6c near the base station 4c. Similarly, the distance 6d and 6e Taiwan Taiwan 6c than the distance near the base station. Therefore, to make best use of the method is first to link the distance units 6a, 6b, 6d and 6e transmission (in the time slot 1), and then transmitted to the distant station

6c. General, the best designated a higher priority to the distance units 6, which requires less energy for each element in order to maintain the communication link.
Distance units 6 for a multi-cell honeycomb-like soft hands-off. Free hand in the soft in the distance units 6 If more than one demodulation simultaneously to distance Taiwan 6 transmission, it can consume more resources. Moreover, in the soft hands-off in the distance units 6 is basically its location near side honeycomb unit, and require more energy for each of the yuan. Thus, the forward link at a high flux through the designated low-priority I let go the distance in the soft platform 6 to be.
Optimal allocation of resources is also depending on the distance units will be 6 determined the amount of data transmitted. The data stored in the transmission selector element 14 is located in the parade. Therefore, the line-up the size of the directed amount of data transmitted. In the beginning of each scheduling interval, all lined up on the size of the work schedule be transmitted to channel scheduler 12. If you lined up the size of the work schedule is fairly small, then the channel scheduler 12 from the rate schedule in order to remove the work. In the main code channels in a satisfactory period of time to achieve a small amount of data transfer. When necessary, channel scheduler 12 allocated to transmit large amounts of data resources. Thus, the distance units of the resources allocated to volume and the distance will be six sets of data transmitted is proportional to the size of the parade.
Will send the data type is the distance between the units designated six priority another important consideration. Some data types for time sensitive and require quick attention. Other data types may allow a longer transmission delay. Clearly, a higher priority for the specified time, the less urgent data.
For example, apparently some distance units transmit data to receive six errors. Distance units 6 can also be encoded by using the channel when the box to receive additional CRC bits determine the time-frame errors. When deciding a coding

channel error when the frame has been received, mark the encoded channel bit error indicates that when the box (EIB), the distance units 6 informed the honeycomb-shaped cells that time frame error. The configuration and use of EIB transmission can be found in US patent case, 5,568,483. Channel scheduler 12 then scheduled to receive the code in the wrong channel when the box re-transmission. Taiwan, six in the distance, the visual error box to receive the encoded channel is determined by the other signal processing. Therefore, channel scheduler 12 for the transfer of data transmission than the first given data also Gaoyao priorities. On the contrary, the formation of the distance from the station 6 to repeat the error when the instructions box swapped out before the link failure. Therefore, prior to distribution of resources to repeat the mistake to link the coded channels when the box receives the re-transmission as a wasteful operation. In this example, the distance being maintained at the 6-hold. Under the high-speed data transmission, data transmission may be temporarily suspended to determine the link state prior to the improvements so far. Channel 2 is still scheduled destroy the instructions coded in the main channel for data transmission, and continued to monitor the forward link performance. When received prior to the link status has improved directions, channel scheduler 12 to remove far away from the reservation status of Taiwan 6, and the right distance units 6 high-speed data transfer. In addition, lined up in the data can be re-scheduled to the number of transmission failures, be removed.

Taiwan, six in the distance specified priorities, it is necessary to provide the data based on type of identification distance units 6. For example for different data transmission services to determine the price system. For those who pay extra, given the higher priority order of light. Through this price system, in the distant station six individual users can decide on the priorities and the service user will receive the pattern. Distant station 6 can also be a priority of 6 units from the distance of the delays experienced a function of volume. The

former can be used to link resources have been allocated with the highest priority in the distance units 6. A result, a low priority station 6 is basically going through a long distance transmission of data. When the distance from the low-priority data sets six experienced increases, the distance sets six priorities scalable. This to prevent the data from the state remain in the line-up in the distance units to low-priority station 6 unlimited transmission distance. There is no order of priority of the upgrades, low priority in the distance units 6 can withstand an intolerable amount of delay. Can be based on a method of increasing priority to upgrade, and makes scheduling and not scheduling work can achieve high-quality communications, which aims to maintain the system. Optimization of these factors would be based on the purpose of the system, given a different group of weights. For example, to enable the former to the maximum link throughput will be greater weight to the distant station 6 the energy required for each element, and with distant station 6 has nothing to do with soft hands-off. This weighting method does not consider the data type, and distance sets six priorities, so the system does not determine appropriate goals. In addition, we can maintain a price structure to allow the distance sets in all six individual users on the decision to distance Taiwan six priorities. To pay additional costs for resources will direct a high potential importance. In this case, the intent to profit and customer satisfaction, maximize the system, even when the transmission needs more resources, continue to first send an additional distance units 6. Can use the above factors lead to other weighting methods, are other factors not discussed any system to reach the target group, this is still within view of the present invention.

The note provides a better implementation of the cases to familiarize themselves with this technology can manufacture and use of the invention. Familiar with this technology can make different changes, while other derivatives defined in the text of the implementation of principles can be used in other cases, instead of using the present invention functions. Therefore, this invention is not restricted to the

implementation of the cases, but based on principle and characteristics of the most extensive in the line of view.

[Brief description schema]

By following the instructions to better understand the characteristics and advantages of the present invention, when read with reference to drawings, the drawings, the same mark that the same components:
Figure 1: In order to contain multiple honeycomb units, a number of base stations and a number of distant stations honeycomb cell network diagram;
Figure 2: Block Diagram shows the CDMA communication system of the present invention the representation of configuration;
Figure 3: In order to channel scheduler of block diagram;
Figure 4: In order to distance Taiwan representative office block diagram of the structure of the receiver;
Figure 5: Before the invention of the link rate-based scheduling of the flow chart;
Figure 6: invention-based flow chart of the specified transfer rate;
Figure 7: The transfer rate-based re-invention of the specified flow diagram;
Figure 8: In order to specify the transfer rates and data transfer rate of transmission when the specified count map; and
Figure 9: Prior to the invention to the link rate-based scheduling use of the map representation.

10, apply for a patent scope:

1. A kind of in a communication network in the forward link scheduling data transmission method, the network contains at least one honeycomb unit and at least one scheduled user, the method includes the following steps: the designation of the at least one honeycomb unit can be used in forward link

capacity; designated a specified transfer rate to that schedule for at least one user in each user; to send the specified transfer rate to that at least one scheduled user; and where the designated delivery Rate is based on the respective honeycomb units can be used for at least the first link capacity to be.
2. If the application scope of patents, paragraph 1, of the method, in which the specified steps, the designated Department of steps and every step of the delivery month time-frame that is repeated K, where K is an integer greater than or equal.
3. If the application scope of patents, paragraph 1, of the method, in which the specified steps to better include the following steps: at least a schedule for that user in the decision of an action component for each user group, the action component group contains the row process the user communications to at least one honeycomb unit; in which the specified transfer rate of further action based on the component group of the at least one honeycomb unit is one or more of the honeycomb-shaped cells that can be used prior to the link capacity may be .
4. If the application scope of patents, paragraph 3, of the method, in which the designated step further includes the following steps: For the schedule of at least one user for each user to receive a line-up length, the length of the line-up will be at least one row of the Cheng users to send each user the amount of data; and one of the designated transfer rate of at least one further schedule based on the users of each user's queue length of the scheduling decisions.
5. If the application scope of patents, paragraph 4 of the way in which the designated step further includes the following steps: generate scheduling priority of the user's table, the table contains the priority of at least one of each row of way users to schedule the user , in which at least one of the scheduled users of a user-specified scheduling priority; and where the specified transfer rate of at least one further schedule based on the users decide the priority of each user.
6. If the application scope of patents in item 5 of the method,

in which the designated step further includes the following steps: scheduling from the user's priority list, select a choice of scheduling users in the priority list in the least a scheduling between users, the choice of scheduling the user with the highest priority; by the user to select a scheduling component of the action group, through which at least one honeycomb cell one or more of the honeycomb-like units, select the schedule for that user computing support on the maximum transmission rate; from the maximum transfer rate options to support a minimum data transfer rate, the minimum transfer rate can be defined as a maximum transfer rate; and where the designated transfer rate is equal to or less than the maximum transfer rate.

7. If the application scope of Article 6 of the patented method, in which the designated step further includes the following steps: Recommend a better transfer rate, the better transfer rate is based on the choice of scheduling the user's line-up length of the decision; and where the specified transfer rate is equal to or less than the better the transfer rate.

8. If the application scope of patents in item 7 of the method, in which the specified steps to better include the following steps: In the scheduling action component of the user group, to update the at least one honeycomb cell one or more of the honeycomb-like cells can be used to link the former capacity, to reflect the allocation of the selection schedule user capacity; as well as from the priority table to remove the scheduled user.

9. If the application scope of patents, paragraph 2, of the method, further includes the following steps: re-specify the schedule for at least one or more users in the 0 to a specified transfer rate of a temporary transfer rate, in which the temporary transfer rate as the least a honeycomb-like unit that can be used in each unit prior to the link capacity of the set.

10. If the application scope of Article 9 of the patent method, where the re-specified step further includes the following steps: generate communication network of the at least one honeycomb cell to produce an effective unit of honeycomb-

shaped honeycomb units temporarily table, the effective cellular like cells possess sufficient transmission power to schedule at least one user to transmit data.
11. If the application scope of Article 10 of the patented method, where the re-specified step further includes the following steps: an effective voice temporary order of priority, the efficient scheduling of the communication network users with at least one scheduled user.
12. If the application scope of Article 11 of the patented method, where the re-specified step further includes the following steps: from the efficient scheduling of users of the temporary order of priority in the user select a valid schedule, in which the temporary order of priority list At least one scheduling between users, the choice of an effective scheduling the user with the highest priority; in the choice of components, scheduling action component of the users group, through which at least one honeycomb cell one or more, for the choice of an effective scheduling the user calculate the maximum transfer rate of the temporary support; from the maximum transfer rate of the temporary supports select a maximum transfer rate, the maximum transfer rate can be defined as the largest temporary transfer rate; and where the temporary transfer rate is equal to or less than the maximum transfer rate temporarily, and the specified transfer rate.
13. If the scope of Article 12 apply for a patent of the method, where the re-specify the steps to include the following steps: an effective scheduling in the user component of the action group, to update the at least one honeycomb cell one or more of the units can be the use of forward link capacity, to reflect the schedule allocated to the choice of effective user capacity; and from the priority list in order to remove the effective scheduling of the user.
14. A kind of in a communication network in the forward link scheduling data transmission devices, the network contains at least one honeycomb unit and at least one scheduled user, the device contains the control device, a communication network used for Road, and to that for at least one from the user's schedule at least one honeycomb cell scheduling of data

transmission, a status information gathering; memory devices, the memory devices connected to the controller device to store the state information ; and the clock device, this time count device connecting to the controller unit to provide a clock signal to the controller device, the clock signal allows the controller to perform data transmission device operating schedule.

11, schema:

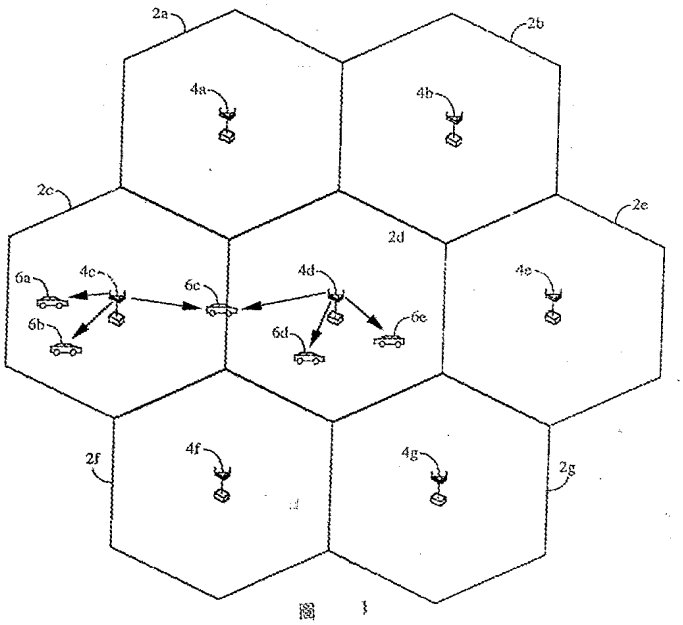

圖 1

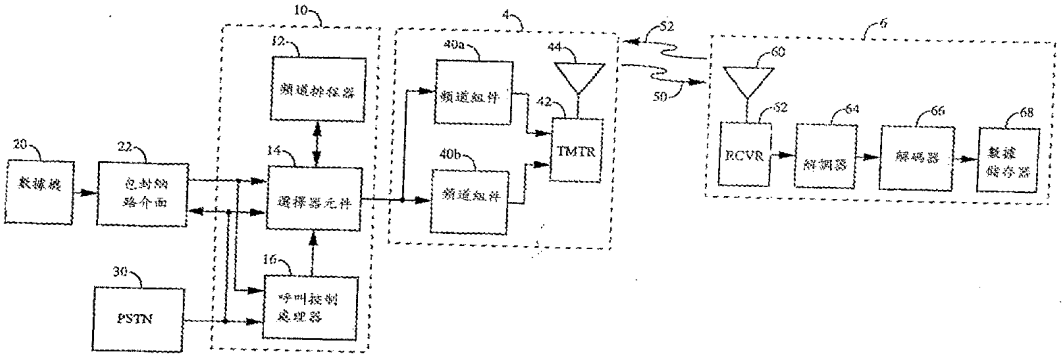

圖 2

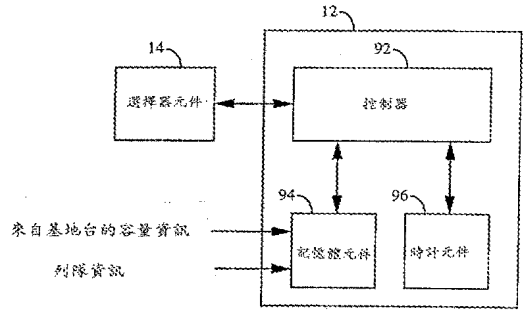
12
14
92
選擇器元件
控制器
94
96
來自基地台的容量資訊
記憶體元件
時計元件
列隊資訊

圖 3

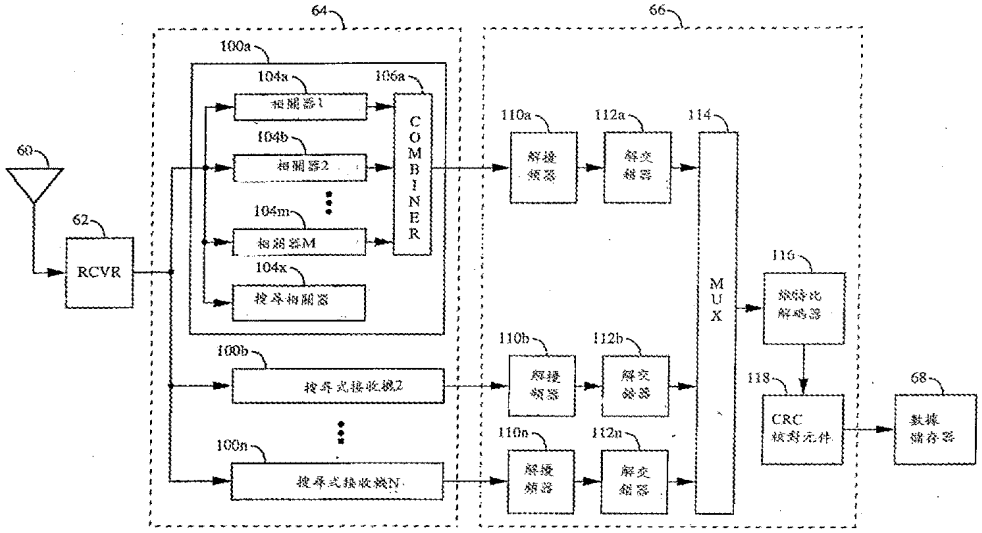
64
66
100a
104a
106a
相關器1
相關器2
相關器M
搜尋相關器
COMBINER
60
62
RCVR
100b
搜尋式接收機2
100n
搜尋式接收機N
110a
112a
114
解擴頻器
解交錯器
MUX
116
解碼器
118
CRC校對元件
68
數據儲存器
110b
112b
110n
112n

圖 4

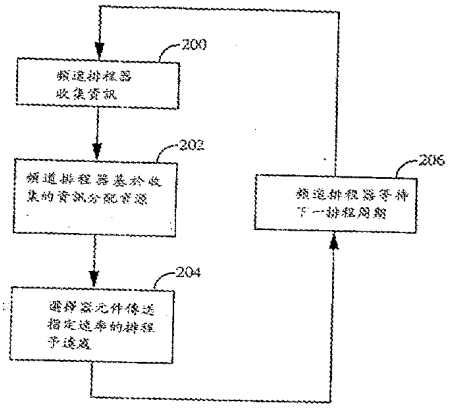
200
頻道排程器收集資訊
202
頻道排程器基於收集的資訊分配資源
204
選擇器元件傳送指定速率的排程予遠成
206
頻道排程器等待下一排程周期

圖 5

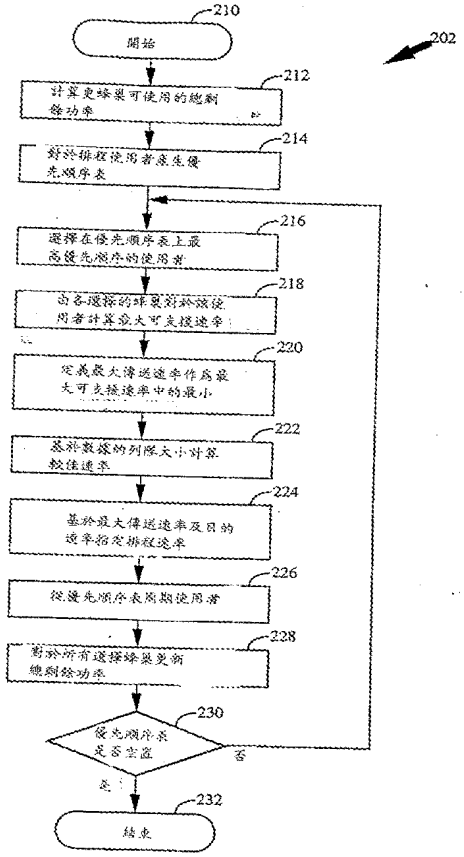
210
開始
202
212
計算更緣果可使用的總剩餘功率
214
對於排程使用者產生優先順序表
216
選擇在優先順序表上最高優先順序的使用者
218
由各選擇的緣果對於該使用者計算最大可支援速率
220
定義最大傳送速率作為最大可支援速率中的最小
222
基於數據的列隊大小計算較佳速率
224
基於最大傳送速率及目的速率指定排程速率
226
從優先順序表刪除使用者
228
對於所有選擇緣果更新總剩餘功率
230
優先順序表是否空值
否
是
232
結束

圖 6

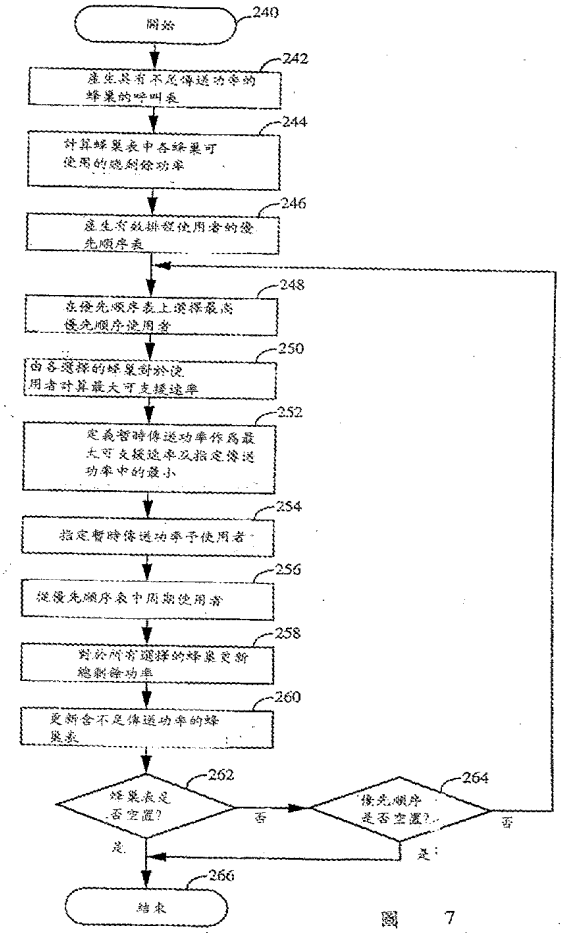
開始
240
產生具有不足傳送功率的蜂巢的呼叫表
242
計算蜂巢表中各蜂巢可使用的總剩餘功率
244
產生有效排程使用者的優先順序表
246
在優先順序表上選擇最高優先順序使用者
248
由各選擇的蜂巢對於使用者計算最大可支援速率
250
定義暫時傳送功率作爲最大可支援速率及指定傳送功率中的最小
252
指定暫時傳送功率予使用者
254
從優先順序表中刪除使用者
256
對於所有選擇的蜂巢更新總剩餘功率
258
更新含不足傳送功率的蜂巢表
260
蜂巢表是否空置?
262
否
優先順序是否空置?
264
否
是
是
結束
266

圖 7

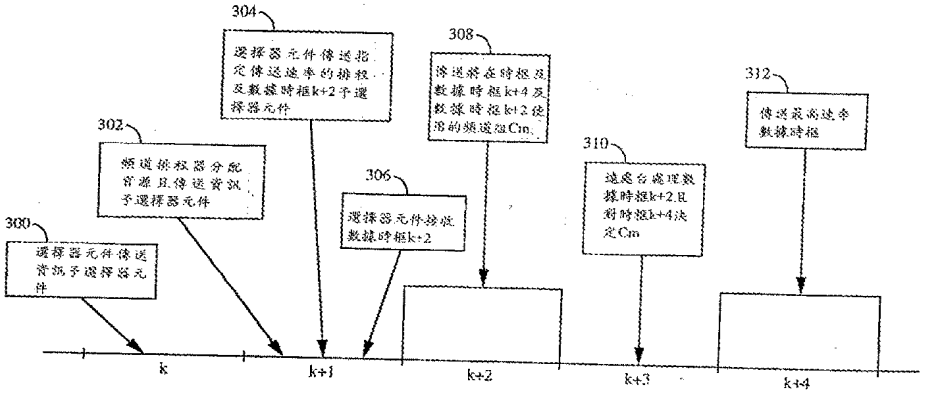
300
選擇器元件傳送資訊予選擇器元件
302
頻道排程器分配資源且傳送資訊予選擇器元件
304
選擇器元件傳送指定傳送速率的排程及數據時框k+2予選擇器元件
306
選擇器元件接收數據時框k+2
308
傳送將在時框及數據時框k+4及數據時框k+2使用的頻道Cm
310
遠處台處理數據時框k+2且對時框k+4決定Cm
312
傳送最高速率數據時框
k
k+1
k+2
k+3
k+4

圖 8

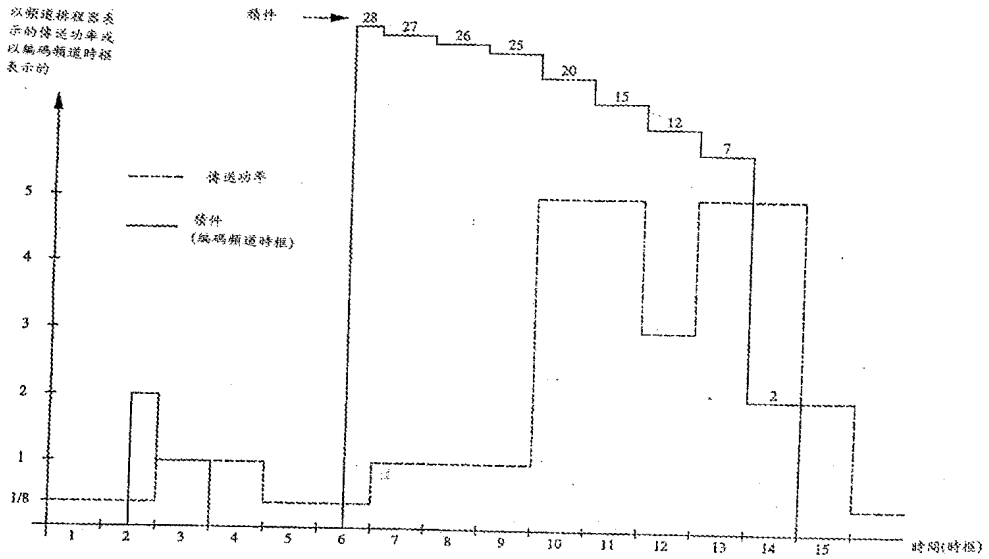
以頻道排程窗表示的傳送功率或以編碼頻道時框表示的
發件
28
27
26
25
20
15
12
7
2
傳送功率
發件
(編碼頻道時框)
5
4
3
2
1
1/8
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
時間(時框)

圖 9